

# Chapter Three

## Health Status

### Health status

The health status of Nashville is a description of the health of the total population, using information representative of most people living in this city. For relatively small population groups; however, it may not be possible to draw accurate conclusions about their health using current data collection methods.

It is generally accepted that there are two components to health status, (1) a subjective one based on an individual, personal reading of health status, and (2) a so-called objective one based on a normative, professional assessment. Subjective health status is defined as a person's own assessment of his or her health. Objective health status refers to an assessment by a health professional. It is recognized that a professional assessment remains a judgment, though based on criteria that are more specific and on which some consensus has been reached.<sup>1</sup>

The information used to report health status comes from a variety of sources, including birth and death records, disease information collected by the Metropolitan Public Health Department of Nashville and Davidson County, and telephone surveys regarding individual risk behaviors.

#### Reference:

1. Bernier L, Sauvageau Y, et al. *User's Guide to 40 Community Health Indicators*. Health and Welfare Canada; 1992.

Two components of health status are:

1. Subjective health status
2. Objective health status

## Related Indicators

- Educational attainment
- Employment/  
Unemployment
- Poverty level
- Household income

## Additional Data

Appendices  
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## Data Sources

Metro Public Health  
Department: BRFSS

## 3.1 Health Status and Quality of Life

### Background

Self-reported quality of life and health status indicators are valuable in assessing the overall health status of a community. They allow the public health community to assess the byproducts of morbidity that are not typically observed in disease surveillance. The World Health Organization first defined quality of life in 1947 to capture the concept of health with optimal physical, mental, and social functioning.<sup>1</sup> Unlike other health status measures, quality of life also captures information about how a person's health perceptions might influence their estimation of their own health status.<sup>1</sup> Health-related quality of life (HRQOL) is often measured in certain subgroups that are considered to be at high risk for disability, such as the elderly or persons with disabling chronic conditions. Measuring HRQOL in the general population offers a basis for the public health community to project demand on services, resources allocation, and even evaluation of existing intervention efforts.<sup>2</sup>

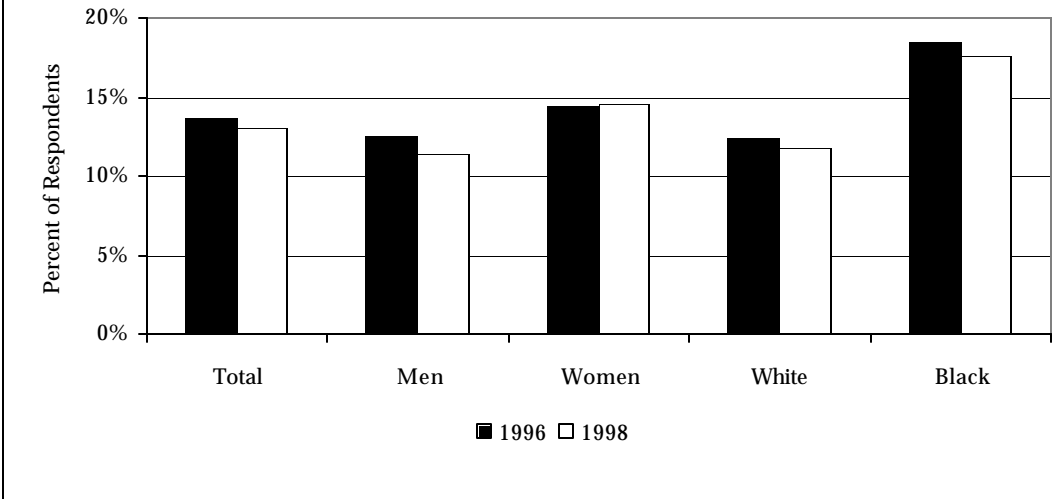
Nashville's 1996 and 1998 BRFSS contain the questions we used to estimate health status and quality of life for Nashville residents. The health status question asked respondents to rate their health as excellent, very good, good, fair, or poor. To reduce the number of categories, we grouped responses as "good or better" and "fair or poor". Quality of life was broken into two categories based on the questions asked in the BRFSS. The first category, unhealthy days, is calculated as the mean number of days that respondents had poor mental or physical health in the last 30 days. The second category, activity limitation days, is calculated as the mean number of days that respondents were limited in their usual daily activities due to poor mental or physical health.

### Findings

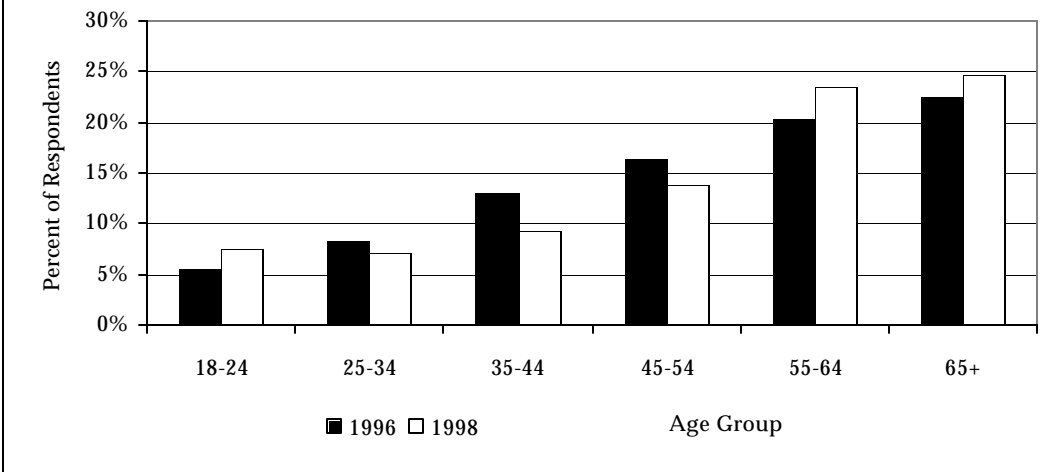
#### Health Status

Approximately 14% of respondents reported fair or poor health status in 1996 (Figure 68). More black respondents rated their health as fair or poor than whites. The overall gender and racial group proportions did not change very much in 1998. When grouped by age, the percentage of persons with self-rated fair or poor health was highest in the 65 and older age group for both survey years (Figure 69). Between 1996 and 1998, the percentage of respondents in fair or poor health increased for the 18-24, 55-64, and 65+ age groups, but it decreased in the middle-age groups of 25-34, 35-44, and 45-54. Respondents with education less than a high school diploma had the highest percentage who rated their health fair or poor – 31% in 1996 and 30% in 1998 (Figure 70). There was little change in the percentages by education level from 1996 to 1998.

**Figure 68. Percent of Respondents Who Reported Fair or Poor Health Status, Nashville, TN, BRFSS, 1996 and 1998**

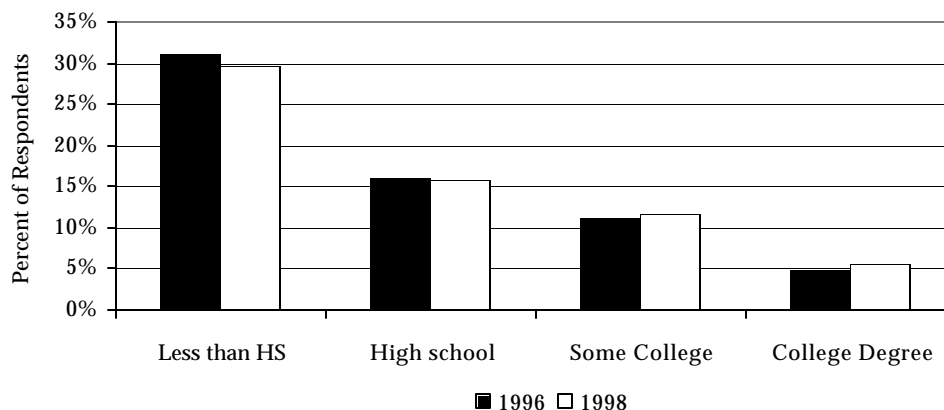


**Figure 69. Percent of Respondents Who Reported Fair or Poor Health Status by Age Group, Nashville, TN, BRFSS, 1996 and 1998**



Approximately 14% of respondents reported fair or poor health status in 1996 and 1998.

**Figure 70. Percent of Respondents Who Reported Fair or Poor Health Status by Education Level, Nashville, TN, BRFSS, 1996 and 1998**



### ***Unhealthy Days***

Respondents had an average of 5.7 days when their physical or mental health was not good (unhealthy days) in the 30 days prior to their interview (Table 17). Women had a higher average of unhealthy days than men (6.4 compared to 4.9). There was no apparent difference between black and white groups. The 25-34 years age group had the fewest unhealthy days (3.9), while the 55-64 group had the most (7.1). Respondents with more education reported less unhealthy days.

The overall trend was fewer reported unhealthy days in all groups in 1998. Total respondents in 1998 reported 5.2 unhealthy days. In 1998, there was a difference between black and white groups – blacks reported more unhealthy days than whites (5.6 compared to 5.1). Trends for gender and education were the same as in 1996. The age group with the least number of unhealthy days changed from the 25-34 group to the 65 years and older group in 1998.

The overall trend was fewer reported unhealthy days in all groups in 1998.

**Table 17. Mean Number of Unhealthy Days and Activity Limitation Days in Adult Respondents to the Nashville BRFSS, 1996 and 1998**

	Mean Unhealthy Days		Mean Activity Limitation Days	
	1996	1998	1996	1998
Total	5.7	5.2	1.7	1.7
<i>Sex</i>				
Male	4.9	4.4	1.6	1.5
Female	6.4	5.9	1.8	1.8
<i>Race</i>				
White	5.7	5.1	1.7	1.7
Black	5.7	5.6	1.9	1.5
<i>Age Groups (years)</i>				
18-24	5.6	5.3	1.4	1.1
25-34	3.9	5.0	1.0	1.5
35-44	5.8	5.1	1.8	1.6
45-54	6.5	5.4	2.2	2.0
55-64	7.1	5.9	3.0	2.3
65+	4.8	3.4	1.1	1.3
<i>Education Completed</i>				
Less than High School	7.8	7.1	2.7	2.5
High School	6.3	5.9	1.8	2.0
Some College	5.7	4.9	1.8	1.4
College	3.5	3.7	0.8	1.1

**Activity Limitation Days**

In 1998, the overall average of activity limitation days (1.7) was the same as in 1996.

As a result of poor physical or mental health, respondents to the 1996 survey reported their usual activities were limited an average of 1.7 days in the 30 days prior to their interview (Table 17). Women had a slightly higher average of activity limitation days than men, and blacks reported more activity limitation days than whites. When the 1996 respondents were grouped by age, the 25-34 years age group reported the fewest days (1.0) of activity limitation and the 55-64 years group reported the most (3.0). Respondents with less than a high school diploma had the highest average for activity limitation days than any education group (2.7).

In 1998, the overall average of activity limitation days was the same as in 1996, but there were many changes in the population groupings. Blacks reported fewer average days than whites (1.5 compared to 1.7). The average number of activity limitation days increased in the 25-34 years age group leaving the 65 years and older group as the one with fewest days, even though this age group also had an increase in average days from 1996 to 1998. All other age groups had a decrease in average activity limitation days. The general trend for education level was still fewer days in higher education level groups. However, the average number of days rose for the high school and college degree groups while it declined for the groups with less than a high school diploma and only some college.

### ***Comparison to Tennessee and United States***

Nashville had a smaller proportion of BRFSS respondents in the fair or poor health category than Tennessee, and about the same proportion as the U.S. (Table 18). When considering gender and race, again the proportion of Nashville respondents was similar to that of the U.S. and smaller than that of Tennessee. The difference in the races was opposite for Tennessee and Nashville – more whites in Tennessee reported fair or poor health, but in Nashville blacks had the higher proportion.

Overall, Nashville residents consider themselves to be in fairly good health.

The distribution of days of poor physical and mental health was approximately the same in Nashville, Tennessee, and the U.S. (data not shown). From the Nashville 1998 BRFSS, it appears that Nashville women reported fewer poor physical health days than women in Tennessee or the U.S. Also from the 1998 survey, Nashville respondents may have had more poor mental health days than Tennessee or the U.S.

**Table 18. Age-adjusted\* Percentages of Respondents with Self-rated Health Status of Fair or Poor, Nashville 1996 and 1998, Tennessee 1999, and U.S. 1999**

	<b>Nashville BRFSS 1996</b>	<b>Nashville BRFSS 1998</b>	<b>Tennessee BRFSS 1999</b>	<b>U.S. BRFSS 1999**</b>
Total	14%	14%	20%	13%
Male	14%	12%	19%	13%
Female	15%	15%	20%	14%
White	13%	12%	21%	12%
Black	21%	20%	18%	17%

\* Age-adjusted to the U.S. 2000 standard population.

\*\* U.S. BRFSS data reflects the median values from data collected for the 50 states, District of Columbia, and Puerto Rico.

### **Discussion**

Overall, Nashville residents consider themselves to be in fairly good health. Health status and quality of life measures should reflect the public health community's efforts to promote good health, therefore, these results suggest that we are doing a fairly good job. However, there is always room for improvement. As we further address and work to solve the racial disparities in morbidity and mortality in Nashville, we hope to see our work reflected in these general yet multidimensional measures. It will not be specific interventions that make the difference in improving quality of life, but the spectrum of public health prevention and promotion activities that will improve the health status of our community as a whole.

### **References:**

1. Hennessy CH, Moriarty DG, Zack MM, et al. Measuring health-related quality of life for public health surveillance. *Public Health Reports*. 1994;109(5):665-72.
2. Simon P, Lightsone A, Zeng Z, et al. Health-related quality of life-Los Angeles County, California, 1999. *Morbidity and Mortality Weekly Report*. 2001;50(26):556-9.

## 3.2 Maternal and Infant Health

The health of women and children is a very important part of our community's health. Birth, infancy, childhood, adolescence, sexual maturity, and childbearing are events in the life cycle that come with physical and social health risks for women, children, and adolescents.

In Nashville, females constituted 51.6% of the year 2000 population; children aged 0-19 constituted 25.4% of the year 2000 population. Together, females and children aged 0-19 constituted 64.6% of Nashville's 2000 population. In the year 2000, 8,946 babies were born to females aged 15-44 in Nashville, and there were 139,540 females aged 15-44 in Nashville in 2000.

Together, females and children aged 0 - 19 constituted 64.6% of Nashville's 2000 population. In the year 2000, 8,946 babies were born to females aged 15 - 44 in Nashville, and there were 139,540 females aged 15 - 44 in Nashville.

## Related Indicators

- Sexual behavior
- Prenatal care
- Perinatal and infant mortality
- Low birth weight
- Preterm birth

## Additional Data

Appendices  
pages D-45 - D-46

## Data Sources

- Metro Public Health Department
- Tennessee Department of Health

### 3.2.1 Teen Births

#### Background

Teenage pregnancy is a problematic and complex issue for any community. There are often adverse economic, social, and health consequences for both the adolescent mother and her child. Teenage mothers are less likely than other teenage females to finish high school or maintain steady employment.<sup>1</sup> These young mothers are also less likely than older women to receive early and adequate prenatal care, and more likely than older women to experience complications during pregnancy such as inadequate weight gain, anemia, preterm labor, and pregnancy-induced hypertension.<sup>1,2</sup>

Infants born of teenage mothers are at risk for adverse health consequences as well. These infants have a greater risk of low birth weight, infant mortality, and other complications of delivery such as respiratory distress syndrome and anemia.<sup>1,2</sup>

The following sections present the data for teen births in Nashville, Tennessee. Several indicators have been developed to measure teen births. The standard indicator is Births to Females Aged 15 - 19. Alternates are 1) Births to Females Aged 10 - 17; 2) Births to Females Aged 10 - 14; 3) Births to Females Aged 10 - 19; and 4) Repeated Births to Teenagers 10 - 19.

Births to Females Aged 15 - 19 includes almost all births to teenagers. Births to Females Aged 10 - 17 tracks teenagers of school age for school health and family planning programs. Births to Females Aged 10 - 14 is a sentinel indicator to track births to very young females. Births to Females Aged 10 - 19 tracks all births to teenagers under 20. Repeated Births to Females Aged 10 - 19 helps to determine the effectiveness of family planning efforts in preventing teenagers who have borne a child from giving birth to a second child while still in their teens.

#### Findings

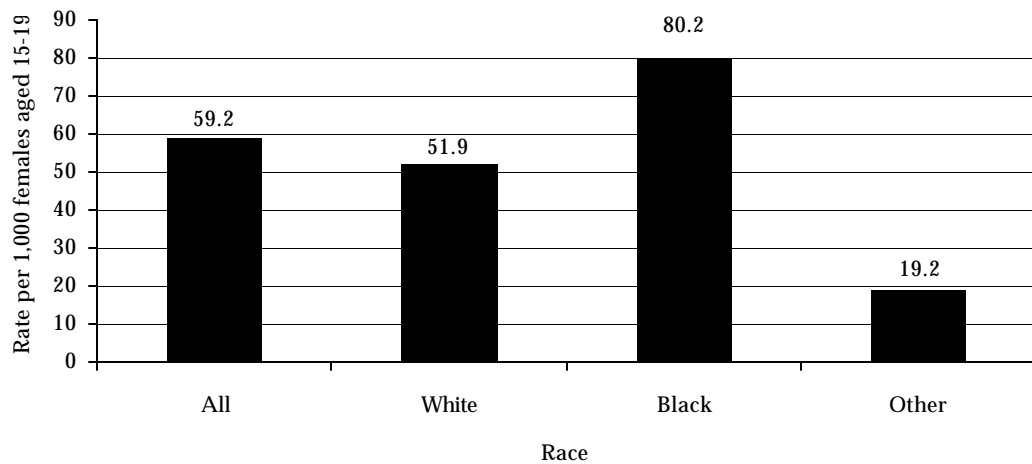
##### *Births to Females Aged 15-19*

In the year 2000, there were approximately 59 babies born for every 1,000 females aged 15-19 in Nashville (Figure 71). There is a large difference between the number of births to white females aged 15-19 compared to black females of the same age for the year 2000. For white females, there were approximately 52 babies born per 1,000, compared to approximately 80 babies per 1,000 born to black females of the same age group. Those of other races experienced the lowest birth rate, with approximately 19 babies born per 1,000 females aged 15-19.

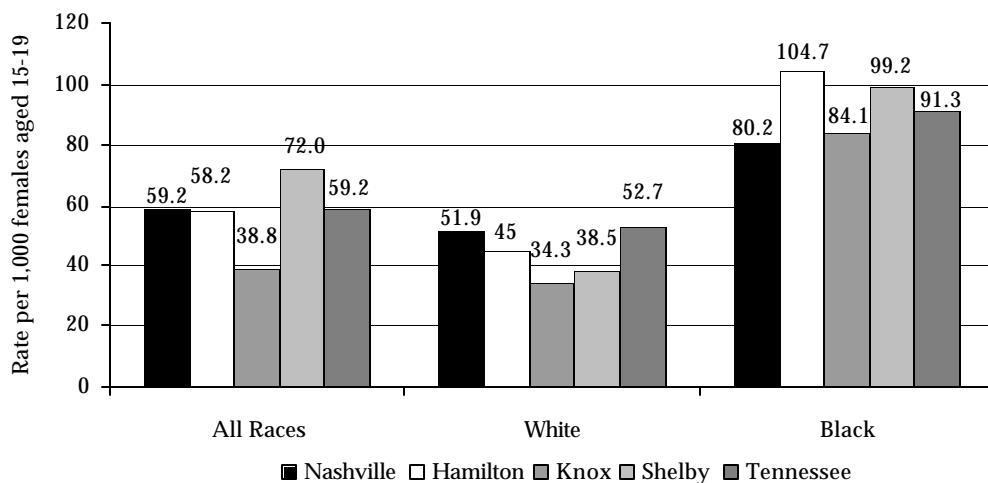
Comparing Nashville's data to Tennessee and with that of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, yields some important observations (Figure 72). All rates discussed are per 1,000 females aged 15-19. The birth rates for teenagers aged 15-19 in Nashville are similar to those in Hamilton County, and Tennessee; 59.2 for Nashville compared with 58.2 for Hamilton, and 59.2 for Tennessee overall. Knox County, however, has a teen birth rate (38.8) much lower than all other geographical areas included in the comparison. On the other side of the spectrum, the rate for Shelby County (72.0) exceeds the rate for all other counties, as well as Tennessee.



**Figure 71. Birth Rates Among Females Aged 15-19 by Race, Nashville, TN, 2000**

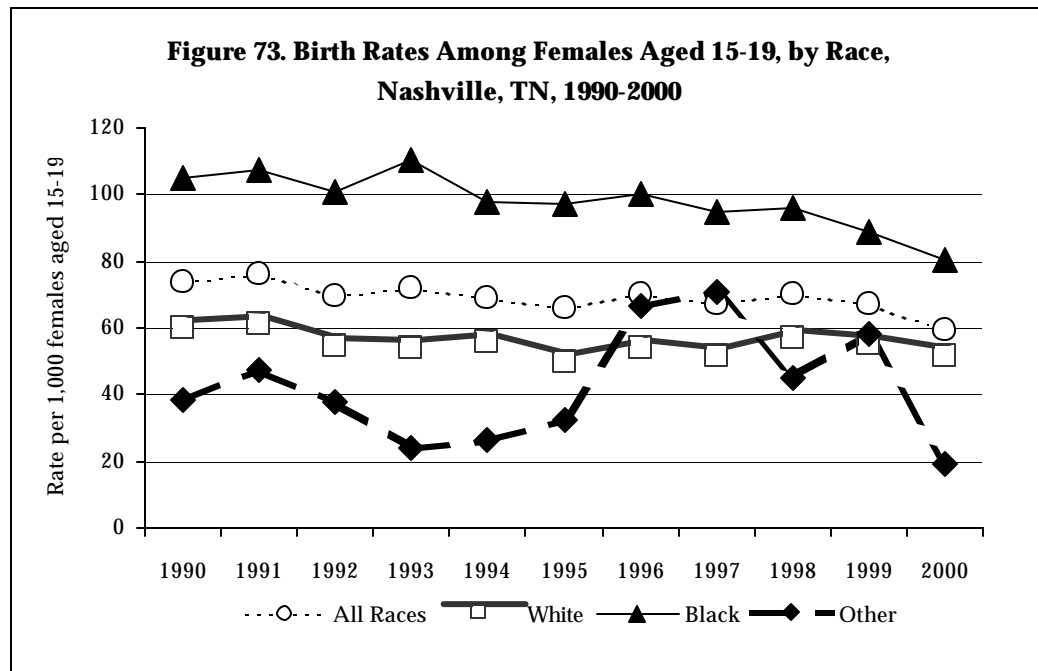


**Figure 72. Birth Rates Per 1,000 Females Aged 15-19, by Race for Selected Counties in Tennessee, 2000**



Examining the differences in teen birth rates by race, it is apparent that the disparity between whites and blacks exists in each county under examination, as well as for the state as a whole. Each county, as well as the state, has a lower rate of white teen births than black teen births. Further examination reveals that Nashville has the highest rate of white teen births (51.9) excluding the State (52.7), while Hamilton County has the highest rate of black teen births (104.7). Knox County has the lowest rate of white teen births in this age group (34.3), and Nashville has the lowest rate of black teen births (80.2).

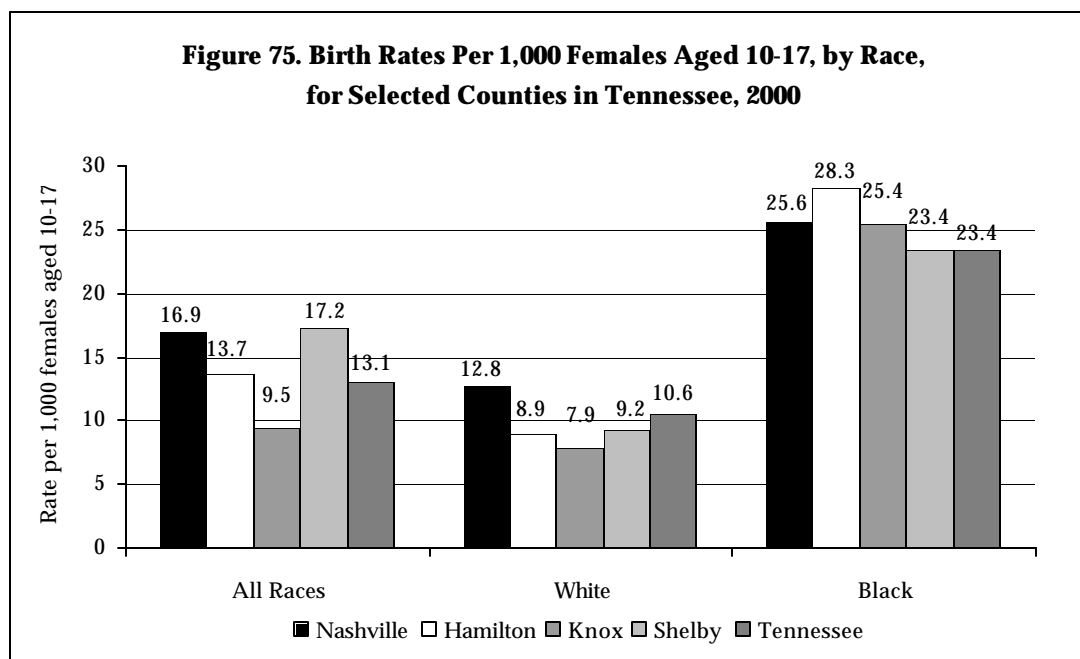
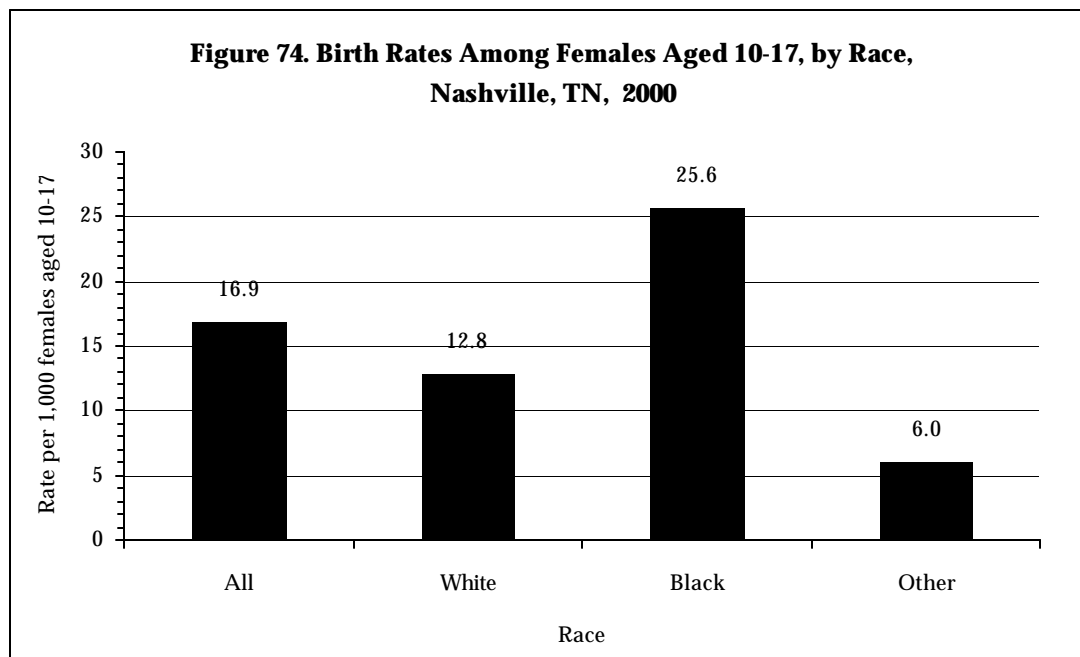
On a national level, teenage births have been declining since the late 1950's,<sup>3</sup> reaching a low of 48.5 births per 1,000 females aged 15-19 in the year 2000.<sup>4</sup> A similar declining trend can be noted for teenage births aged 15-19 in Nashville. As illustrated in Figure 73, there were 74 babies born per 1,000 females aged 15-19 in 1990. This rate has declined to 59.2 in the year 2000, a decrease of 20%. This declining trend is still in evidence when examining birth rates by race. For whites, the rate was 59.8 per 1,000 in 1990 and had declined to 51.9 per 1,000 in the year 2000, a decrease of 13%. The rate for blacks was 104.8 per 1,000 in 1990 and had dropped to 80.2 per 1,000 in 2000, a decrease of 23%; those of other races experienced a rate of 38.6 per 1,000 in 1990 and a much lower rate of 19.2 in 2000, a decrease of 50%. The apparent fluctuation in the birth rate for females of other races is most likely due to the small number effect, where small numbers produce unstable rate estimates. (See Technical Notes.)



### ***Births to Females Aged 10-17***

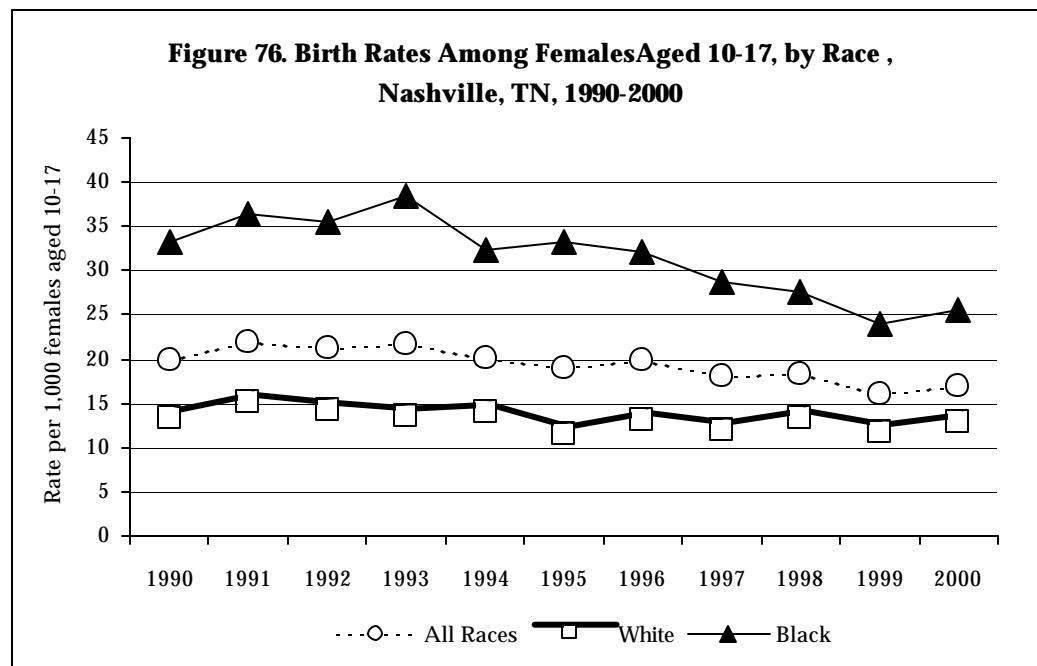
In the year 2000, there were approximately 17 babies born for every 1,000 females aged 10-17 in Nashville (Figure 74). There is a large difference between the number of births to white females aged 10-17 compared to black females of the same age for the year 2000. For white females, there were approximately 13 babies born per 1,000, compared to approximately 26 babies per 1,000 born to black females of the same age group. Those of other races experienced the lowest birth rate with approximately 6 babies born per 1,000 females aged 10-17.

Comparing Nashville's data with that of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, and Tennessee, yields observations similar to those noted for teen births to females aged 15-19 (Figure 75). All rates discussed below are per 1,000 females aged 10-17. The birth rates for teenagers aged 10-17 in Nashville (16.9) is second only to the rate of Shelby County (17.2). Nashville exceeds both the rate of Tennessee (13.1) and the rate of Hamilton County (13.7). Knox County has the lowest rate of those compared with 9.5 births per 1,000 women aged 10-17.



There is a large disparity between the rates for whites and blacks in the geographic areas under consideration. Each county, as well as Tennessee, has a lower rate of white teen births than black teen births in this age group. Further examination reveals that Nashville has the highest rate of white teen births (12.8), while Hamilton County has the highest rate of black teen births (28.3). Knox County has the lowest rate of white teen births in this age group (7.9), and Shelby County ties with Tennessee for the lowest rate of black teen births (23.4).

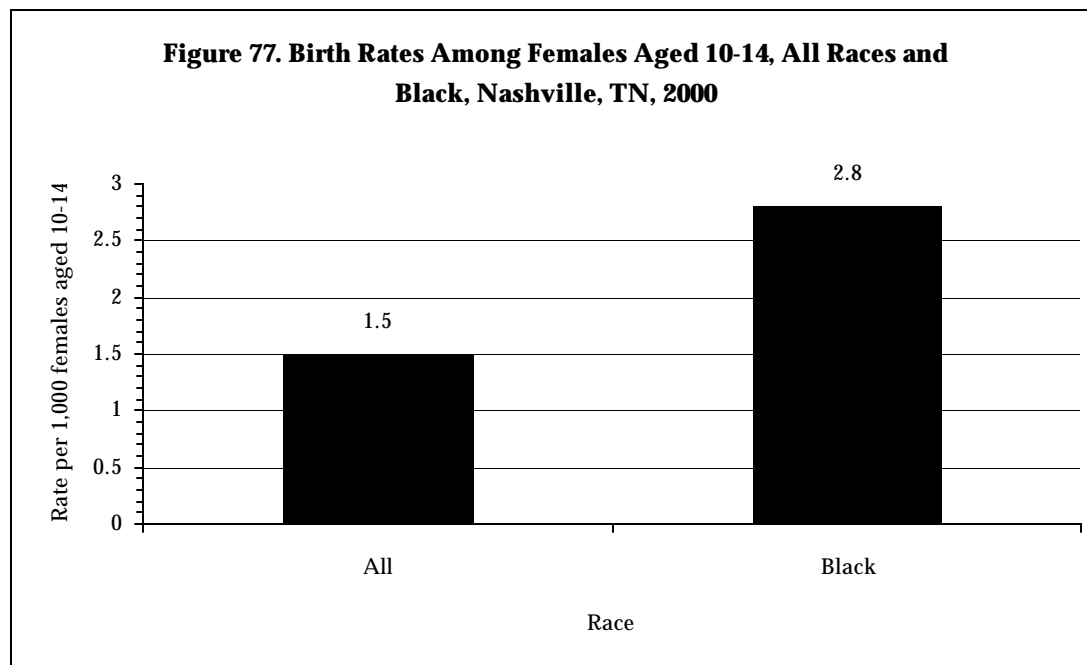
Births among those aged 10-17 do not exhibit the same amount of decline as among adolescents aged 15-19. As depicted in Figure 76, the overall rates for Nashville and for whites alone seem to be fairly stable over time. In 1990, 20 babies per 1,000 were born to teenaged mothers aged 10-17 overall. This rate has declined to nearly 17 babies per 1,000 in the year 2000, a decrease of 15%. White mothers aged 10-17 had approximately 13 babies per 1,000 in 1990 and in 2000. Black mothers aged 10-17, on the other hand, demonstrate a decline in birth rates, with approximately 33 babies per 1,000 in this age group in 1990, and approximately 26 babies per 1,000 in the year 2000, a decrease of 23%. Births to females of other races were excluded from this analysis due to extremely small numbers and unreliable rate estimates.



#### ***Births to Females Aged 10-14***

Although adolescent females aged 10-14 contribute relatively few births to the overall adolescent pregnancy rate, the consequences of pregnancy for this age group are likely to be more severe than in older adolescent females.<sup>5</sup> A female in this age group is less developed cognitively and biologically than her older adolescent counterpart.<sup>6</sup> In addition, a girl who becomes pregnant at this age is more likely to bear more children while still in her teens than older adolescent females.<sup>7</sup>

In Nashville, there were nearly 2 babies per 1,000 females aged 10-14 in the year 2000 (Figure 77). There were so few babies born to white females and females of other races in this age group that they were excluded from further analysis. Black teenage females experienced a higher birth rate than the overall rate with nearly 3 babies per 1,000 females aged 10-14. Both rates are higher than the birth rate for females aged 10-14 in the United States (0.9).<sup>4</sup>



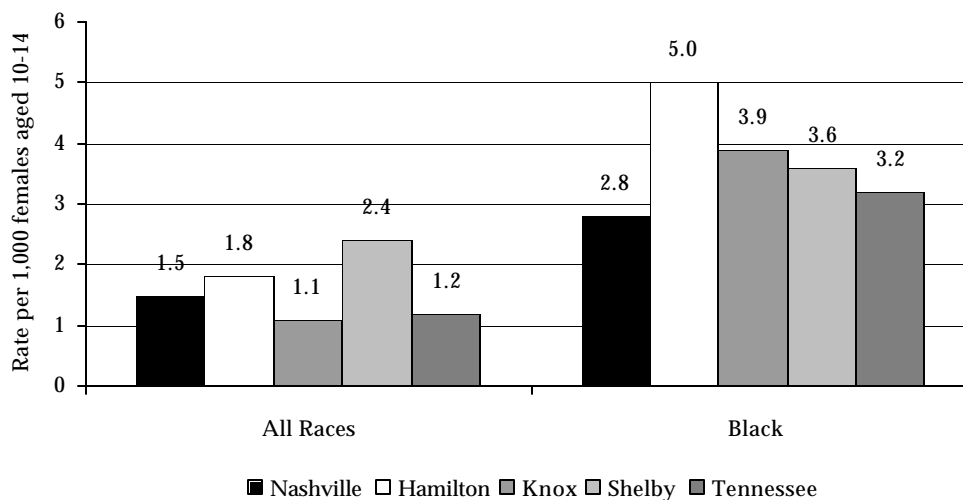
Comparing Nashville's data with that of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, and Tennessee, yields observations similar to those noted for teen births to females aged 15-19 and 10-17 (Figure 78). All rates discussed below are per 1,000 females aged 10-14. The birth rate for adolescent females aged 10-14 in Nashville (1.5) is slightly higher than the birth rates for Knox County (1.1) and Tennessee (1.2). Both Hamilton (1.8) and Shelby (2.4) Counties have birth rates higher than Nashville.

There is a large disparity between the overall birth rates and the rates for blacks in the geographic areas under consideration. Each county, as well as Tennessee, has a lower overall rate of teen births than black teen births in this age group. Further examination reveals that Hamilton County has the highest rate of black births (5.0) to females aged 10-14. Nashville has the lowest rate of black teen births (2.8) for this age group, while Knox (3.9) and Shelby (3.6) Counties, as well as Tennessee (3.2) fall between those two extremes.

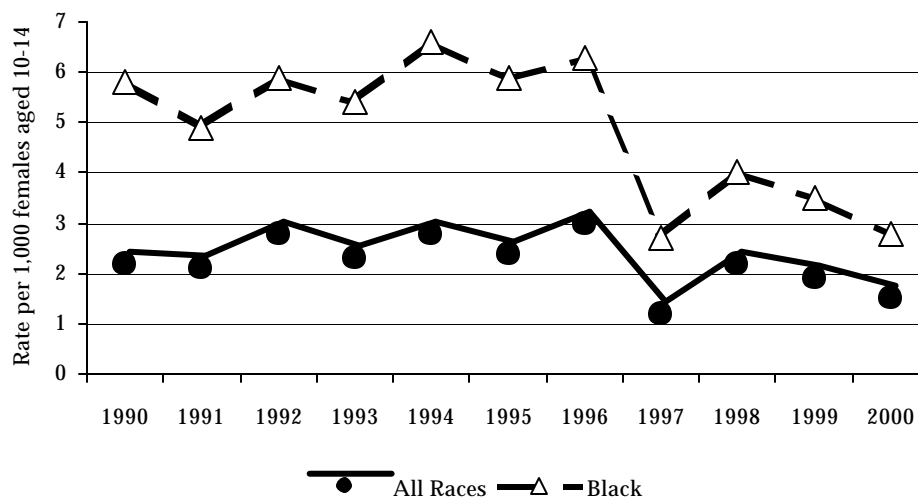
There has been a declining trend in births to females aged 10-14 for the past ten years, both overall and for blacks. This declining trend, however, has much variation, as well as a drastic decline from 1996 to 1997. It is unknown if this fluctuation is the result of the small number effect or the result of an actual community phenomenon (Figure 79).

In the year 2000, there were approximately 59 babies born for every 1,000 females aged 15 - 19 in Nashville; approximately 17 babies born for every 1,000 females aged 10 - 17; nearly 2 babies per 1,000 females aged 10 - 14; and nearly 33 babies per 1,000 females aged 10 - 19.

**Figure 78. Birth Rates Per 1,000 Females Aged 10-14, All Races and Blacks, Selected Counties and Tennessee, 2000**



**Figure 79. Birth Rates Among Females Aged 10-14, All Races and Black, Nashville, TN, 1990-2000**

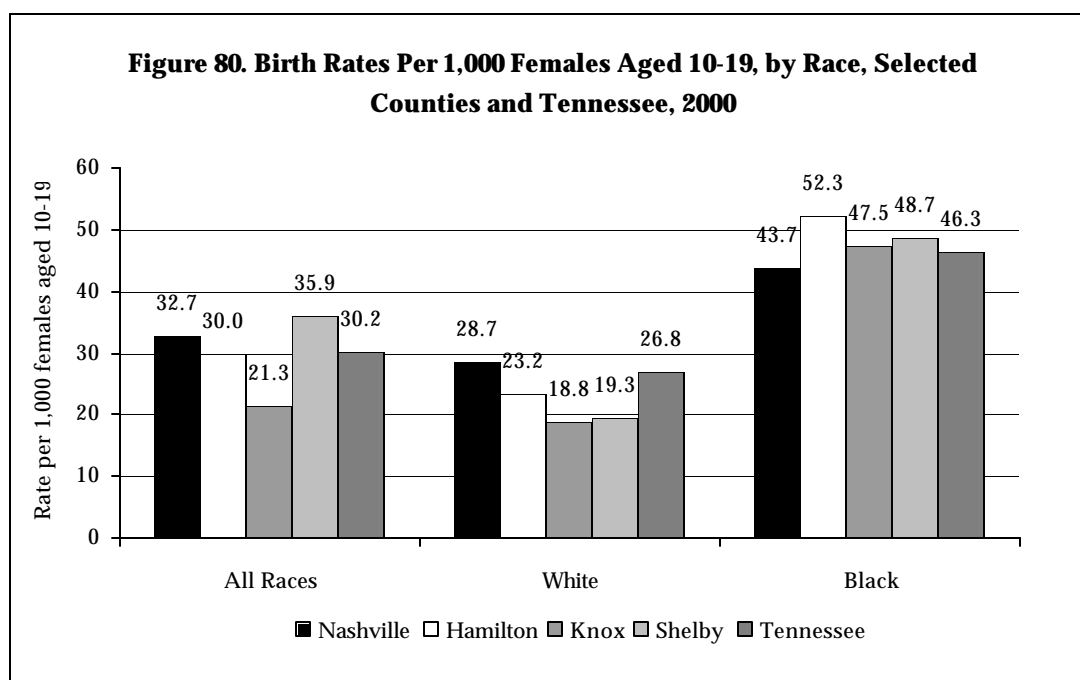


### ***Births to Females Aged 10-19***

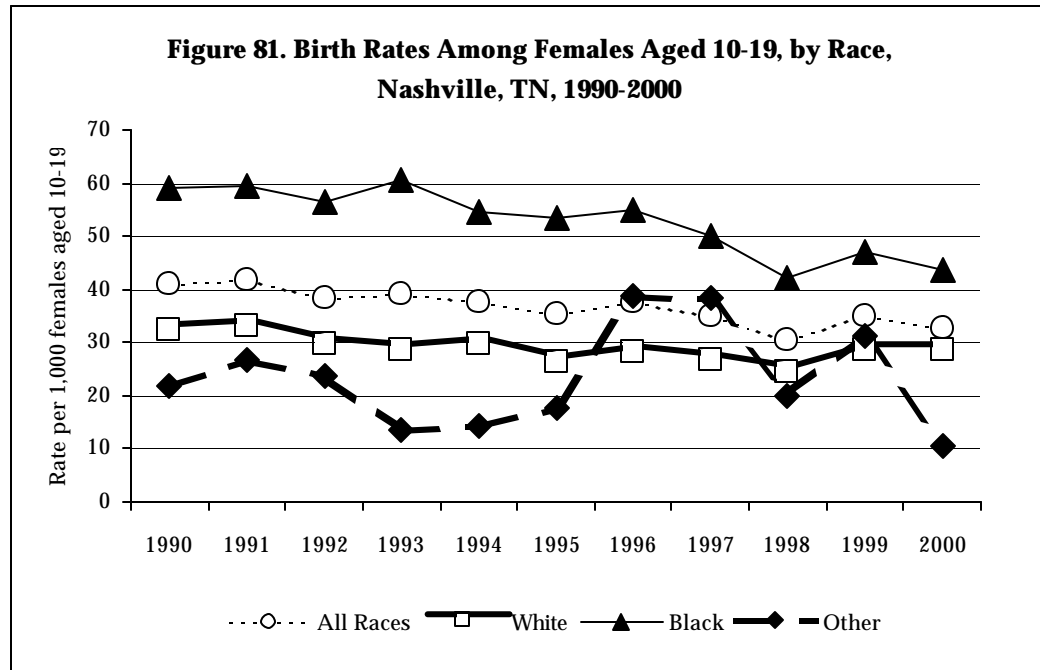
Examining adolescent births as an entire group yields results similar to those noted previously. In Nashville, there were nearly 33 births per 1,000 females aged 10-19 during the year 2000. This rate is not evenly distributed across the races, as is illustrated in Figure 80. Females of other races experienced the lowest birth rate with approximately 11 babies born per 1,000 females aged 10-19. Whites had a rate of approximately 29 per 1,000 females, and blacks had the greatest number of births yielding a rate of nearly 44 babies per 1,000 females aged 10-19.

Comparing Nashville's data with that of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, and Tennessee, yields observations similar to those noted for teen births to females aged 15-19, and 10-17. All rates discussed below are per 1,000 females aged 10-19. The birth rate for adolescent females aged 10-19 in Nashville (32.7) is second only to the birth rate in Shelby County (35.9). Knox County has the lowest rate of births for this age group (21.3), with Hamilton County (30.0) and the Tennessee rate (30.2) approximately the same.

There is a large disparity between the overall birth rates and the rates for blacks in the geographic areas under consideration. Each county, as well as Tennessee, has a lower rate of white teen births than black teen births in this age group. Further examination reveals that Nashville has the highest rate of white births (28.7), and Knox County has the lowest (18.8). Shelby County has a white birth rate (19.3) slightly higher than that of Knox County. For black births to females aged 10-19; however, Hamilton County has the highest rate (52.3), and Nashville has the lowest (43.7).



As depicted in Figure 81, the birth rates for teen females aged 10-19 exhibit a slow decline during the past decade. Blacks consistently have the highest birth rates, although this trend also demonstrates a slow decline. Birth rates for females of other races aged 10-19 demonstrate a great deal of variation during the past ten years. Although graphically, it appears the birth rate has great fluctuations from year to year, this variation is most likely due to unstable rate estimates resulting from the small number of births to females of other races in Nashville.



### ***Repeat Births To Teens Aged 10-19***

The efficacy of public health family planning programs among the teenage population can be evaluated by examining adolescents with subsequent pregnancies. As indicated in Table 19, the percentage of teens aged 10-19 with repeat births in Nashville is roughly 30%. In 1998, 32.2% of teenage mothers had a repeat birth. In 1999, that percentage dropped slightly to 24.6% but increased in 2000 to 31.2%.

Dissimilar to the data examined thus far, the disparity between white and black teenage mothers for this indicator is not very large. Furthermore, the disparity appears to be decreasing instead of increasing. In 1998, 38.5% of black teenage mothers had a repeat birth, compared to 26.2% of white teenage mothers. In 1999, 29.4% of black teenage mothers had a repeat birth compared to 20.3% of white teenage mothers. In the year 2000, however, the disparity declined significantly, with 33.3% of black teenage mothers having a repeat birth compared to 29.3% of white teenage mothers.



**Table 19. Number and Percentage of Teenage Births that Are Repeat Births by Race, Nashville, TN, 1998-2000**

Year	All Races		White		Black		Disparity*
	Number	Percentage	Number	Percentage	Number	Percentage	
1998	402	32.2	166	26.2	229	38.5	46.9
1999	289	24.6	122	20.3	161	29.4	44.8
2000	358	31.2	166	29.3	184	33.3	13.7

Total may include events with race other than white or black

\*The disparity is the percentage difference between whites and blacks. It is calculated as follows:  $((\% \text{black} - \% \text{white}) / \% \text{white}) \times 100$ . Negative numbers indicate a percentage decrease, and positive numbers indicate a percentage increase.

## Discussion

Adolescent birth rates in Nashville show considerable variation by race. Black adolescent females consistently have higher birth rates than either white females or females of other races of the same age. In 2000, the birth rate for black females aged 10 - 19 is approximately 50% higher than the rate for white females the same age. This disparity has been in evidence for the past decade, and little to no reduction in the size of the gap is indicated.

Additionally, there is a consistent pattern of increasing birth rate by maternal age during the adolescent years. Overall, in Nashville, an adolescent female aged 15 - 19 is nearly 40 times more likely to give birth than an adolescent aged 10 - 14. Among blacks, females aged 15 - 19 are nearly 29 times more likely to bear a child than their 10 - 14 year old counterparts.

Teenage birth rates have been slowly declining over time. In Nashville, the rate in 1990 for 10-19 year olds was 40.9 per 1,000 females. By the year 2000, the birth rate had decreased to 32.7 per 1,000, a 20% decrease. From 1990 to 2000, the birth rate for whites aged 10-19 decreased 11.7%. During the same time frame, the birth rate for blacks decreased 26%, and the birth rate for females of other races decreased 51.8%.

The declines in teenage birth rates in Nashville mimics the national trend.<sup>1</sup> Although the exact causes of the decline are not known, possible contributing factors include adolescent pregnancy prevention efforts, higher rates of contraceptive use, and greater economic opportunities for teenagers during the 1990's.<sup>3</sup>

In order to address teenage pregnancy in Nashville, MPHHD facilitates the Nashville Adolescent Pregnancy and Prevention Council (NAPPC). This organization is a community coalition comprised of representatives from various agencies, businesses, and organizations working together to address the issues of adolescent pregnancy and prevention in Nashville. NAPPC participates in, and hosts, community and school health fairs, and has produced and aired community awareness messages on television. The group also hosts an annual "Best Practices" conference for professionals working with youth. For more information or to join this organization contact Sheryl Wynn, Regional Coordinator for the Tennessee Adolescent Pregnancy Prevention Program and Community Liaison for NAPPC, in the Division of Health Promotion at MPHHD.

## References:

1. Alan Guttmacher Institute. *Sex and America's Teenagers*. New York: Alan Guttmacher Institute; 1994.
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Adolescent birth rates in Nashville, show considerable variation by race. Black adolescent females consistently have higher birth rates than either white females or females of other races the same age.

## Related Indicators

- Prenatal care
- Perinatal and infant mortality
- Maternal mortality

## 3.2.2 Fertility

**Background**

Fertility is defined as the birth rate of a community during a specific year. It measures the ratio between the number of live births in the community during a specified time period and the number of females of childbearing age in the population. It is important to note that fetal deaths and stillbirths are not counted as live births, and are therefore, excluded from this analysis. The fertility rate is calculated by dividing the number of live births in a population by the number of women of childbearing age, and multiplying the result by 1,000.<sup>1</sup>

The fertility rate of a population is believed to be influenced by a multitude of behavioral and biological factors, including exposure to contraception and intercourse, and factors that impact pregnancy.<sup>2</sup> The degree of fertility in a community is an important public health issue. Proper planning for future population growth ensures continuing access to public services and healthcare. On the other hand, uncontrolled growth can negatively impact economic and environmental health, thereby leading to negative effects on a population's physical health.<sup>3</sup>

**Findings*****Births to Females Aged 15-44***

In the year 2000, 8,946 babies were born to females aged 15-44 in Nashville. The birth rate for all races combined for that year is approximately 64 babies born per 1,000 females in this age group.

## Additional Data

Appendices  
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## Data Sources

- Metro Public Health Department
- Tennessee Department of Health

**Figure 82. General Fertility Rates for Females Aged 15-44 by Race, Nashville, TN, 2000**

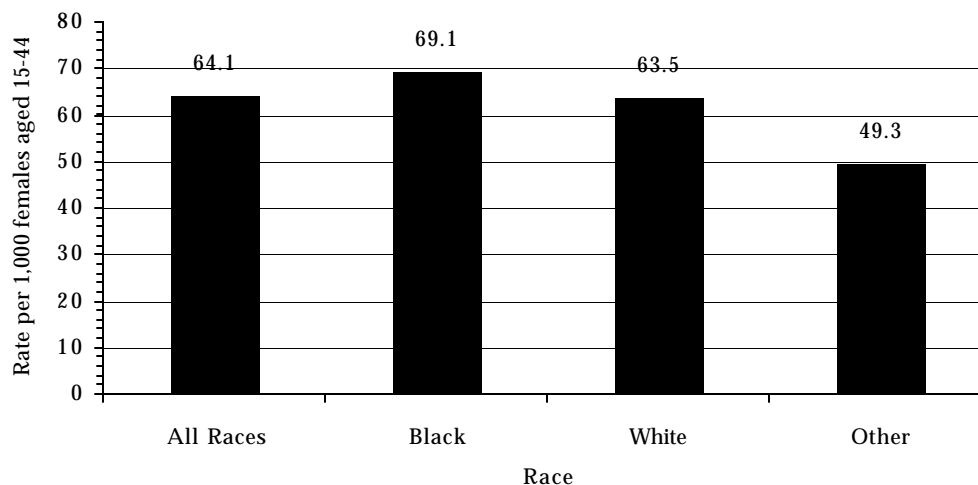
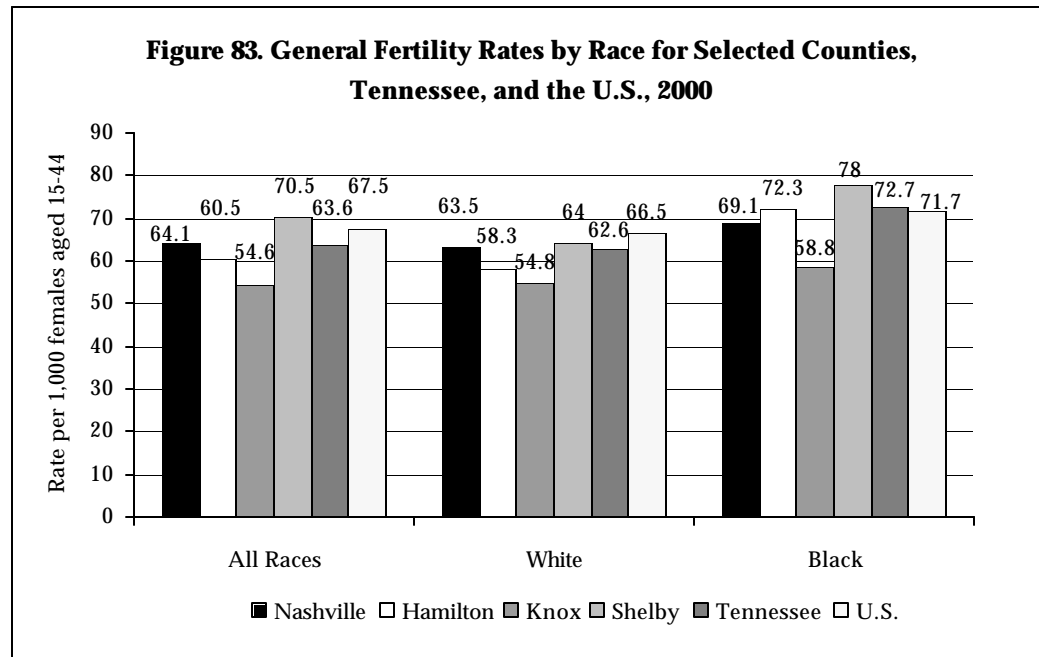


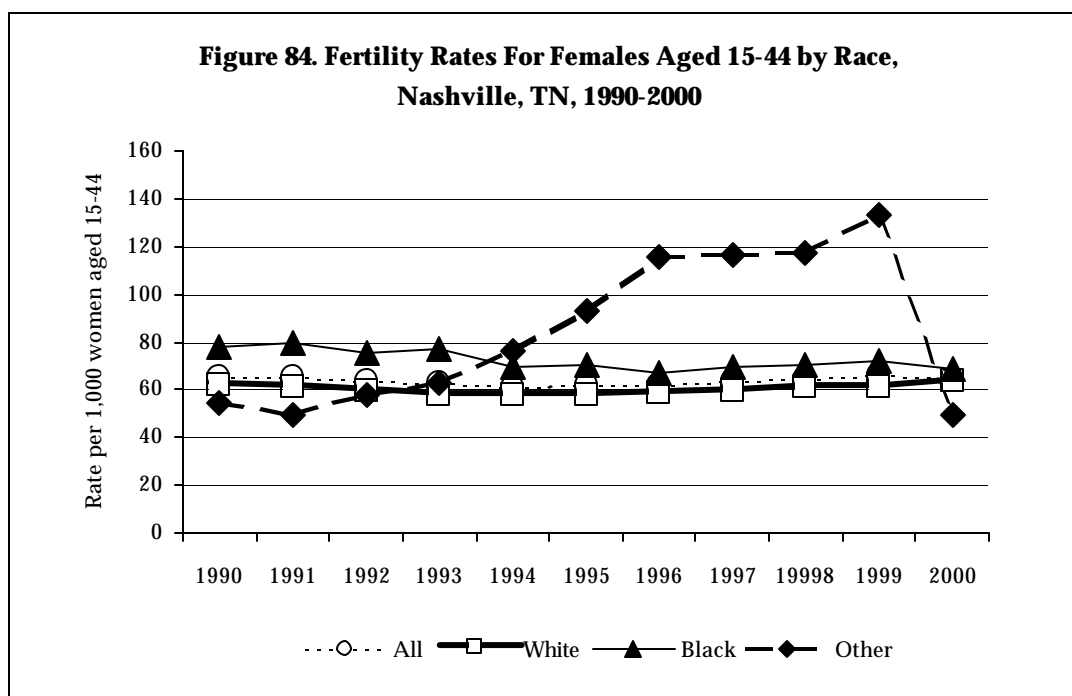
Figure 82 depicts fertility rates by race for the year 2000. Blacks have a slightly higher rate than whites or all races combined. Females of other races have a birth rate much lower than any of the previous categories.

Comparing Nashville's fertility rates with that of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 83). All rates discussed are per 1,000 females aged 15-44. The fertility rate in Nashville (64.1) is slightly higher than that of Tennessee (63.6), but is lower than both the U.S. (67.5) and Shelby County (70.5). Knox County has the lowest fertility rate of 54.6 per 1,000 females aged 15-44.



Examining the differences in fertility rates by race indicates that Knox County has the lowest fertility rate for whites (54.8). All the counties being compared, as well as Tennessee, have fertility rates for whites that are lower than the U.S. rate (66.5). A different picture emerges for blacks, however. Knox County, again, has the lowest fertility rate (58.8). Nashville has a fertility rate for blacks (69.6) that is lower than both the Tennessee rate (72.7) and the rate for the U.S. (71.7). Shelby County has the highest black fertility rate (78.0) of all the geographical areas compared.

Figure 84 depicts the fertility rate in Nashville for 1990-2000, overall and grouped by race. On average, the birth rate in Nashville has been steady throughout the past decade. The rates for blacks are consistently higher than the overall rate, while the rates for whites are consistently lower. Although the rate for women of other races appears to have both steep inclines and declines, this is most likely attributable to the effect of small numbers and unreliable fertility rate estimates.



### ***Births to Unmarried Females***

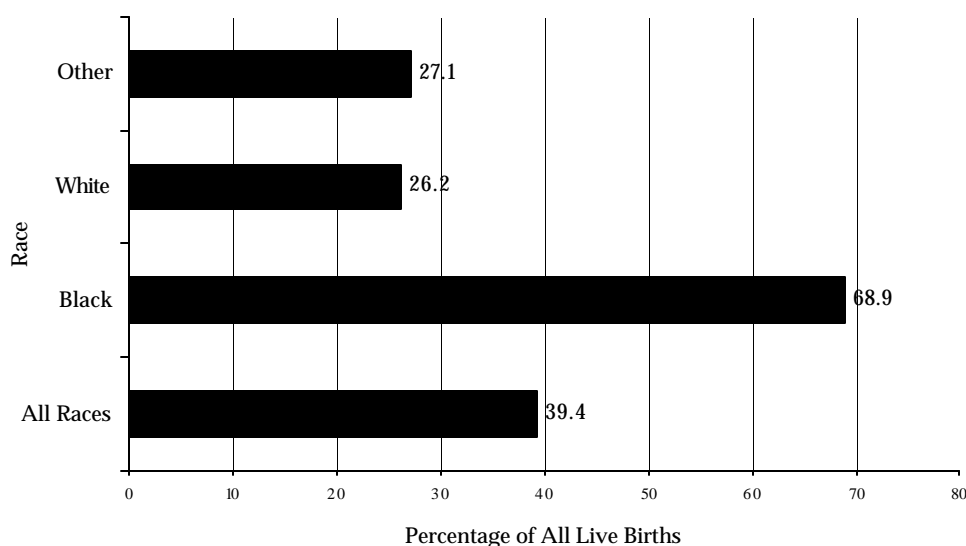
Marital status has long been recognized as being associated with pregnancy outcome most likely because babies of unmarried mothers tend to be of a lower birth weight<sup>4</sup> and at a higher risk of infant mortality than babies of married mothers.<sup>5</sup> Unmarried females tend to have more risk factors associated with poor pregnancy outcome.<sup>6</sup> For example, unmarried females are less likely to obtain prenatal care in the first trimester of pregnancy than married females.<sup>7</sup>

It is important to note, however, that it is extremely unlikely that legal marital status causes any of the aforementioned outcomes. Marital status is most likely a surrogate marker for other unmeasurable social and economic risk factors.

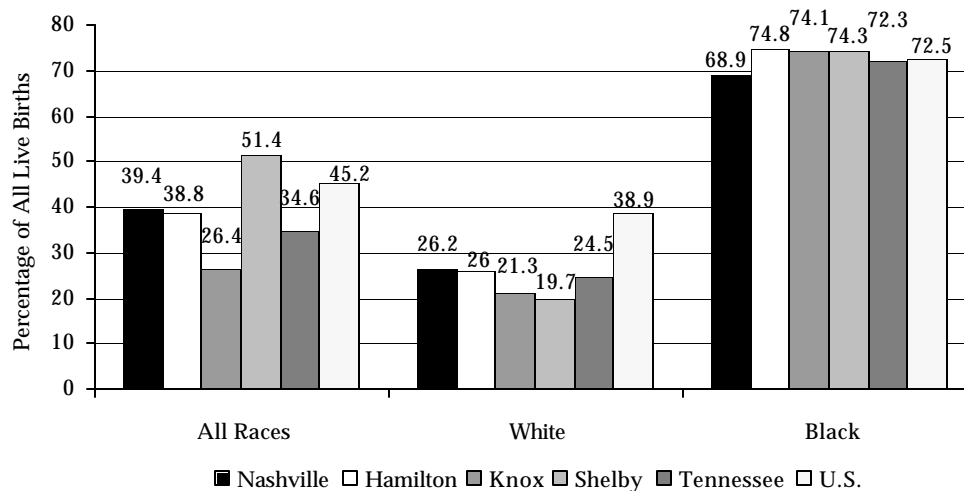
In the year 2000, 39.4% of all live births were to unmarried mothers (Figure 85). Black females had the highest percentage by far, with nearly 69% of live births occurring to unmarried mothers. White females and females of other races had roughly the same percentage with 26% for whites and 27% for females of other races.

Comparing the percentage of babies born to unmarried females in Nashville with the percentages of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 86). Shelby County had the highest percentage of live births to unmarried women (51.4%), and Knox County had the lowest (26.4%) of all geographic areas compared. Nashville had a higher percentage (39.4%) than Hamilton County (38.8%), and Tennessee (34.6%). However, only Shelby County had a percentage (51.4%) higher than the U.S. (45.2%).

**Figure 85. Percentage of All Live Births to Unmarried Females by Race, Nashville, TN, 2000**



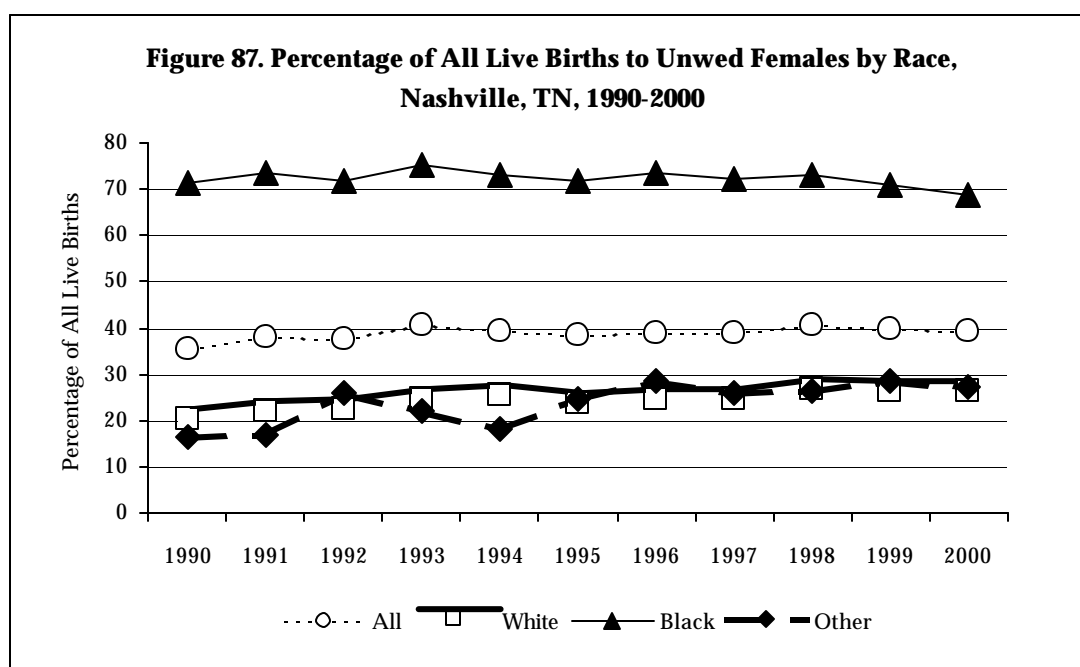
**Figure 86. Percent of All Live Births to Unmarried Females by Race for Selected Counties, Tennessee, and the U.S., 2000**



In the year 2000, 8,946 babies were born to females aged 15 - 44 in Nashville.

The percentage of all live births to unwed females demonstrates a great disparity by race. All the counties being compared, as well as Tennessee and the U.S., have lower percentages of live births to unmarried females for whites than for blacks. Shelby County had the lowest percentage for whites (19.7%), and all areas have lower percentages than the U.S. (38.9%). Nashville has a higher percentage (26.2%) of live births to white unmarried females than Tennessee (24.5%), but approximately the same percentage as Hamilton County (26%). For blacks, Nashville has the lowest percentage (68.9%) of all areas compared. Although Hamilton County has the highest percentage of live births to black unwed females (74.8%), Knox County (74.1%), Shelby County (74.3%), Tennessee (72.3%), and the U.S. (72.5%) all have approximately the same percentages.

Percentages of live births to unmarried females have been remarkably stable throughout the past decade (Figure 87). Black percentages of live births to unmarried females seem stable at approximately 70%, while percentages for Nashville as a whole are approximately 40%. Percentages of live births to unmarried females for whites and females of other races have remained nearly equivalent, with an approximate percentage of 25 for both.



In Nashville, the percentage of live births to unmarried females increased slightly by 11% from 1990 to 2000. Similarly, the percentage increased for whites during the same time period by 27.8%. Percentages for blacks, however, decreased by 3.4% from 1990 to 2000. Females of other races had the greatest percentage increase of 65%.

### Discussion

The fertility rate in 2000 was 64 babies per 1,000 females aged 15 - 44. This rate is higher than the rate for Tennessee, but lower than the rate for the U.S. Nashville's birth rate has been stable for the past decade. Despite the steady birth rate, however, the number of babies born each year is increasing, indicating population growth. In 1990, for example, there were 8,706 live births to females aged 15 - 44, compared to 8,946 babies born in the year 2000.

Since a direct indicator of socioeconomic status is unavailable in this dataset, the percentage of live births to unwed females is examined. According to the data, the percentage of infants born to unwed females increased during the past decade by 11%. The percentage for blacks decreased by 3.4%, while the percentages for whites and females of other races increased by 27.8% and 64% respectively. This may indicate that the percentage of infants being born into economically disadvantaged households is increasing in Nashville. Further studies linking births with a better measure of socioeconomic status are needed.

MPHD offers comprehensive, full-range family planning services at the Lentz, Woodbine, East, and Downtown Clinics. In addition to full physicals, MPHD offers screening for sexually transmitted diseases, all methods of birth control, health education on reproductive issues, and free pregnancy testing. For more information regarding these family planning services, please refer to the MPHD website located at <http://healthweb.nashville.org>.

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In the year 2000, 39.4% of all live births were to unmarried mothers. Black females had the highest percentage by far, with nearly 69% of live births occurring to unmarried mothers.



## Related Indicators

- Fertility
- Perinatal and infant mortality
- Low birth weight
- Maternal mortality

## Additional Data

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## Data Sources

Metro Public Health  
Department

### 3.2.3 Prenatal Care

#### Background

Prenatal care forms the cornerstone of services offered to pregnant females, and includes three components: risk assessment, medical treatment, and health education. It is well established that a relationship exists between prenatal care and birth outcomes.<sup>1</sup> Early and adequate care ameliorates the risk of low birth weight and preterm delivery. It also reduces both morbidity and mortality for the mother and her child. On the other hand, inadequate or no prenatal care is associated with increased risks of low birth weight, preterm delivery, and mortality of the mother and child.<sup>1-3</sup> Although all pregnant females are encouraged to get early and frequent prenatal care, those most in need of services but least likely to receive them tend to be younger, socially disadvantaged females. Not surprisingly, these are the very females with high risks for poor pregnancy outcomes.<sup>1</sup>

#### Findings

##### *Females Receiving First Trimester Prenatal Care*

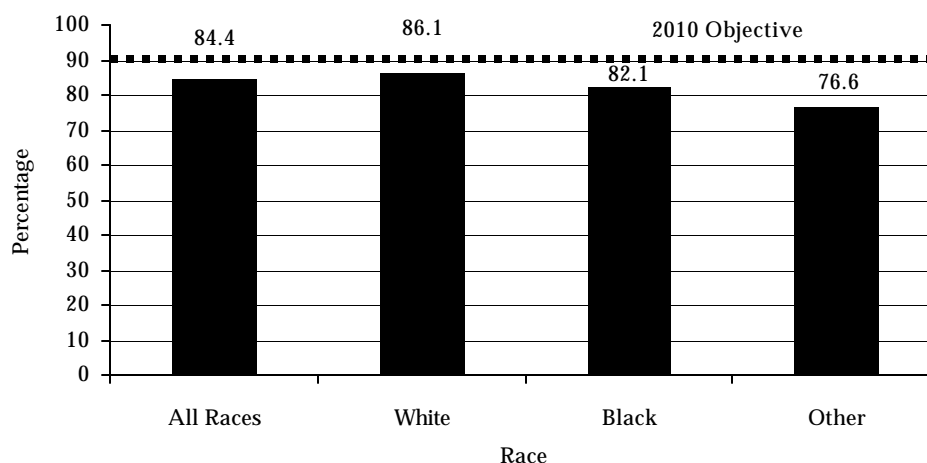
Early and adequate prenatal care improves the chances of giving birth to a healthy baby. The Healthy People 2010 Objective 16.6 is to have 90% of pregnant females accessing prenatal care within the first trimester of pregnancy. This indicator is defined as the number of females beginning prenatal care within the first three months of pregnancy, divided by the total number of females giving birth within a specified time period multiplied by 100.

Overall, approximately 84% of pregnant females in Nashville are entering prenatal care during the first trimester. In Nashville, white females have the highest percentage of first trimester care with approximately 86%, and black females are not far behind with 82.1%. Lastly, in Nashville, 77% of females of other races received prenatal care during the first trimester (Figure 88).

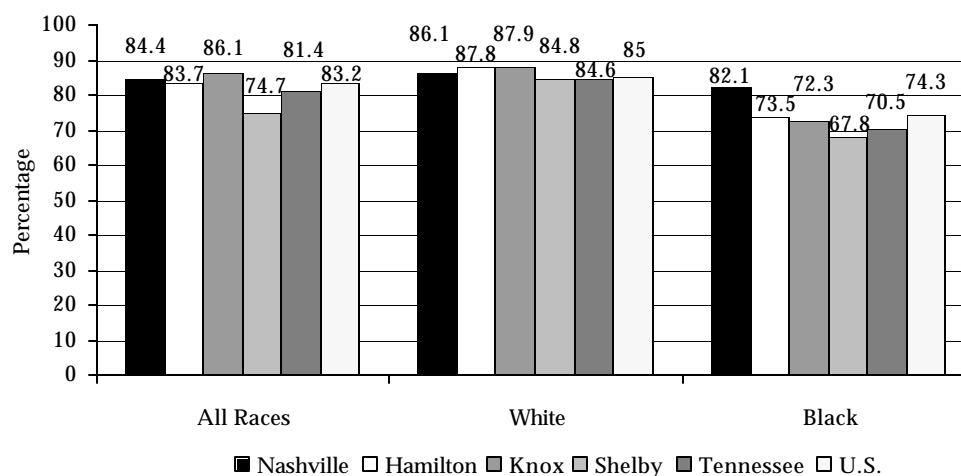
Comparing the percentages of females entering first trimester care in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 89). Nashville has a higher percentage (84.4%) of females accessing care during the first trimester of pregnancy than Hamilton County (83.7%), Shelby County (74.7%), Tennessee (81.4%), and the U.S. (83.2%). Knox County has the highest percentage of all areas compared (86.1%).

Examining the differences in first trimester care by race indicates that Knox County has the highest percentage for whites (87.9%) followed closely by Hamilton County (87.8%). Nashville has a percentage for whites (86.1%) higher than Shelby County (84.8%), Tennessee (84.6%), and the U.S. (85%). All areas under examination have higher percentages of first trimester care for whites than for blacks. Nashville has the highest percentage of black mothers accessing prenatal care in the first trimester of pregnancy (82.1%) than any of the other areas compared, including Tennessee (70.5%), and the U.S. (74.3%). Shelby County has the lowest percentage for blacks (67.8%).

**Figure 88. Percentage of Females with Live Births Who Started Prenatal Care during the First Trimester by Race Compared to the Healthy People 2010 Objective, Nashville, TN, 2000**



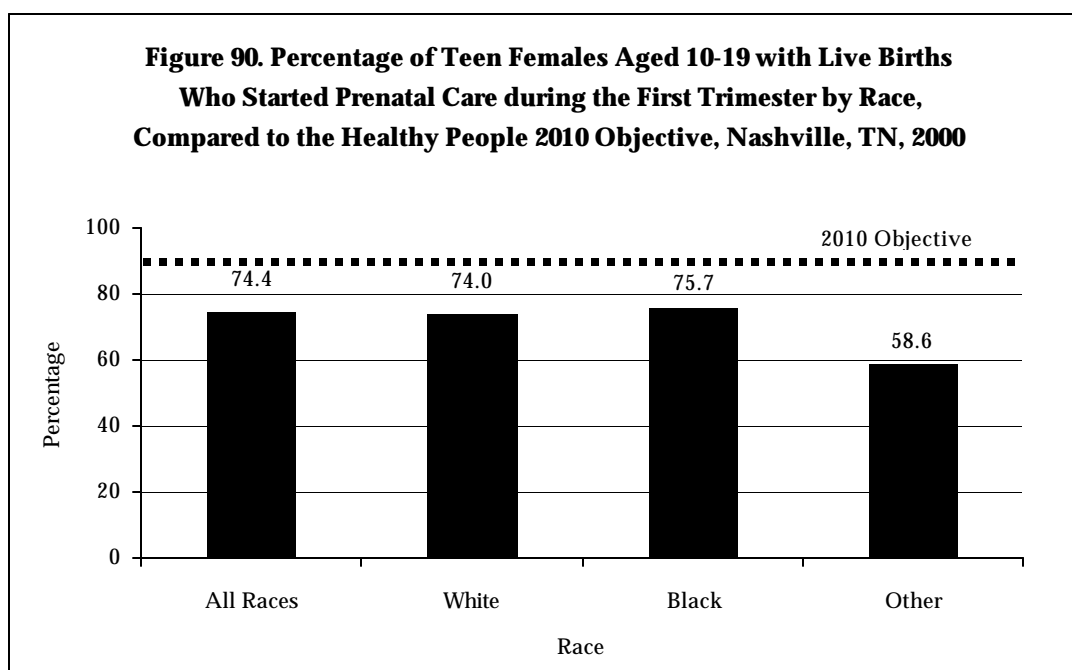
**Figure 89. Percentage of Females with Live Births Who Started Prenatal Care during the First Trimester by Race, for Selected Counties, Tennessee, and the U.S., 2000**



Overall, approximately 84% of pregnant females in Nashville are entering prenatal care during the first trimester.

In 2000, fewer teen mothers received early care compared to pregnant females in Nashville as a whole.

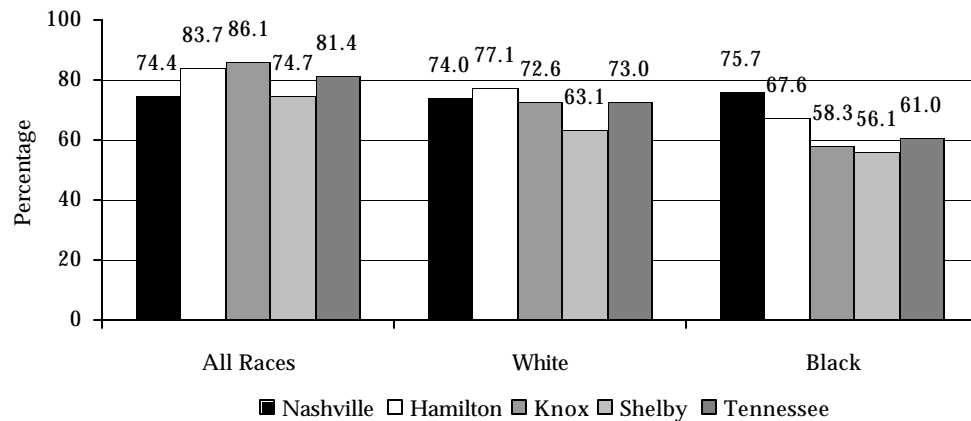
If we examine the data for mothers aged 10-19, the picture is less encouraging (Figure 90). Teen mothers are at risk for poor perinatal outcomes. Early prenatal care can provide these young mothers with nutritional counseling, STD screens, smoking cessation programs, and other services likely to improve the health of the mother and the child. In 2000, fewer of these teen mothers received early care compared to pregnant females in Nashville as a whole. The percentages of teen mothers who received first trimester prenatal care is 74.4%, a percentage considerably lower than the percentage of pregnant females as a whole (84.4%). Among teen mothers aged 10-19, more black females (75.7%) than white females (74.0%) received prenatal care in the first trimester. Only 58.6% of females of other races received first trimester prenatal care.



Comparing the percentages of females aged 10-19 entering first trimester care in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, and Tennessee, yields some important observations (Figure 91). Nashville has the lowest percentage (74.4%) of teen females accessing prenatal care during the first trimester of pregnancy of all areas compared. Knox County has the highest percentage (86.1%) of females aged 10-19 entering prenatal care during the first trimester of pregnancy.

Examining the differences in first trimester care by race indicates that Hamilton County has the highest percentage for whites aged 10-19 (77.1%). Nashville has a percentage for whites (74%) higher than Shelby County (63.1%), Knox County (72.6%), and Tennessee (73.0%). All areas under examination have higher percentages of first trimester care for whites than for blacks, with the exception of Nashville. Nashville has the highest percentage of black mothers accessing prenatal care in the first trimester of pregnancy (75.7%) than any of the other areas compared, including Tennessee (61.0%). Shelby County has the lowest percentage for blacks (56.1%).

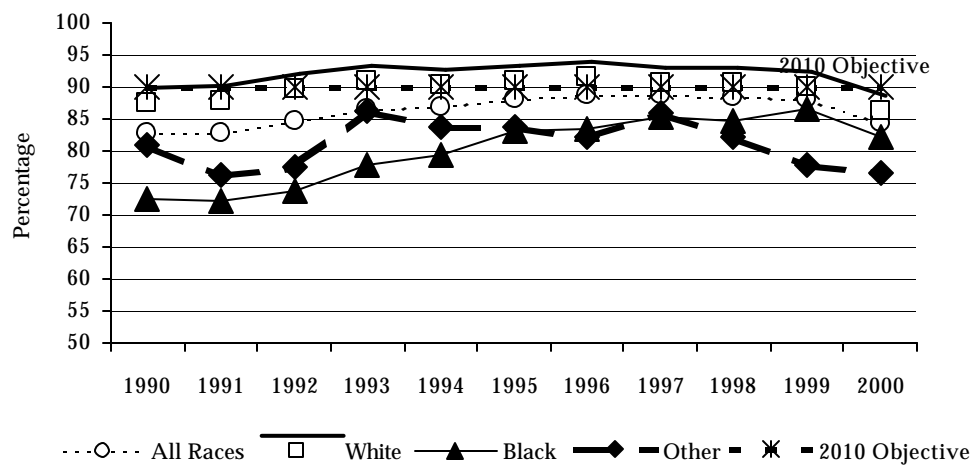
**Figure 91. Percentage of Teen Females Aged 10-19 with Live Births Who Started Prenatal Care during the First Trimester by Race, for Selected Counties and Tennessee, 2000**



Nashville has the lowest percentage (74.4%) of teen females accessing prenatal care during the first trimester of pregnancy of all areas compared.

Since 1990, there has been a steady increase in the percentage of females entering prenatal care during the first trimester of pregnancy. Despite this steady increase, however, the percentage for Nashville as a whole has not reached the 2010 objective. There seems to be a plateau of approximately 88%, which is seen during the years 1995 through 1999 (Figure 92).

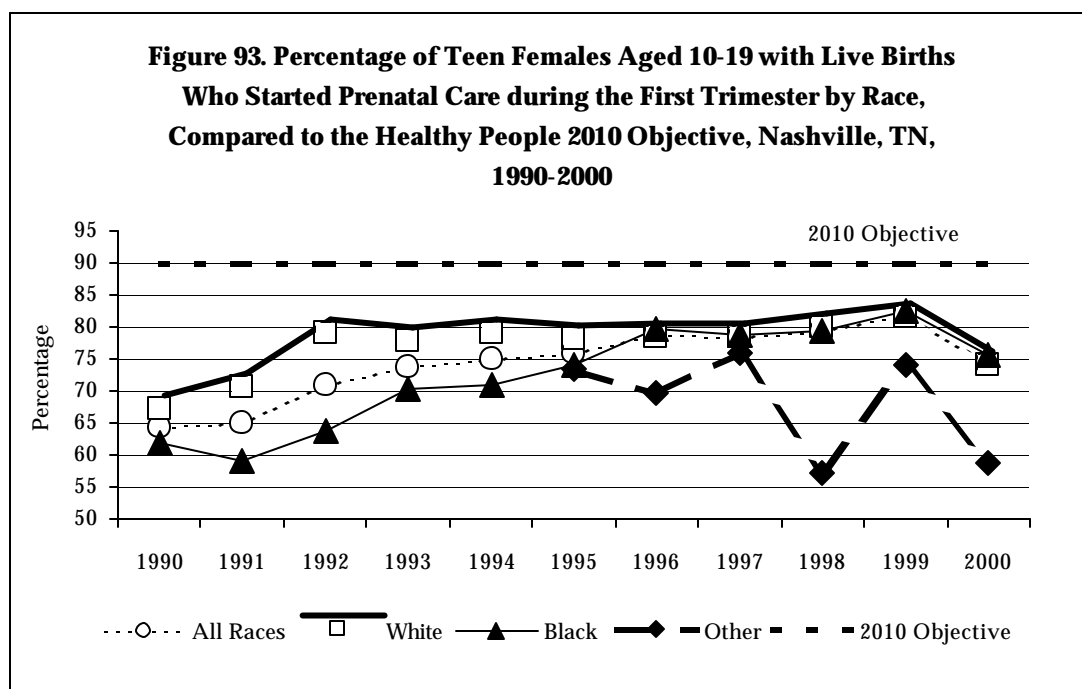
**Figure 92. Percentage of Females with Live Births Who Started Prenatal Care during the First Trimester by Race, Compared to the Healthy People 2010 Objective, Nashville, TN, 1990-2000**



The year 2000 data demonstrates a decrease of first trimester care among pregnant females from the 1999 level. This decline is apparent overall and in all racial groupings. It is unknown if this apparent decline is an aberration or the start of a declining trend.

Examining prenatal care by race, whites were the only group that reached the Healthy People 2010 objective of 90%. A plateau of approximately 90-91% occurred during 1993-1999, followed by a decrease in 2000. The highest percentage occurred in 1996 with 91.5% of white females beginning prenatal care during the first trimester. The greatest improvement can be found among blacks. In 1990, only 72.5% of black pregnant females started prenatal care in the first trimester. That number had risen to 86.7% by 1999. A 14.6% decrease is noted in the year 2000, decreasing from 86.7% in 1999 to 74.0% in 2000. Similarly, a downward turn is noted among females of other races, a percentage decrease of 5.3%. The trend in this group appears to be erratic, with the numbers ranging anywhere from 76.1% in 1991 to a high of 86.2% in 1993. The erratic behavior of the trend is most likely related to the small number effect and unreliable estimates more so than an actual trend.

The trend for pregnant females aged 10-19 presents a drastically different picture than the one for females in general (Figure 93). In this population, much work will be needed to achieve the Healthy People 2010 objective. Overall, the percentages for the 10-19 population who received first trimester care have been steadily increasing since 1990. This trend mimics the trend for Nashville as a whole. In 1990, only 64.4% of pregnant teenagers were beginning prenatal care during the first trimester of pregnancy. By 1999, however, this number had increased to 81.8% but fell to 74.4% by the year 2000, a decrease of 9%.



Overall, the percentages for the 10 - 19 population who received first trimester care have been steadily increasing since 1990.

Similar to the trends of the overall population, whites generally have the highest percentages of first trimester care during pregnancy, while black teens have the greatest amount of improvement during this time. By 1996, the numbers for white and black teens have become very similar. They mimic each other closely, including the downturn noticed in 2000.

### ***Females Receiving Late or No Prenatal Care***

In addition to recording the number of females entering prenatal care during the first trimester of pregnancy, Nashville also records the number of females who receive late or no prenatal care. Late or no prenatal care prevents early identification of mothers at high risk for poor perinatal outcomes such as preterm delivery, low birth weight, and congenital defects. Lack of early and adequate prenatal care also reduces the number of opportunities for maternal education on a wide range of topics concerning the health of both the mother and the child. Educational topics might include information on future pregnancy prevention, the prevention of birth defects, general nutrition, breastfeeding, and the signs and symptoms of preterm labor.

The importance of this measure is that it allows the identification of groups who most need access to services. Why females do not receive prenatal care is a complex issue. Potential barriers to care include: lack of access to the health care systems through physical or financial barriers, psychosocial barriers such as fear of stigma and lack of social support, and lack of education concerning the benefits of prenatal care.<sup>1</sup>

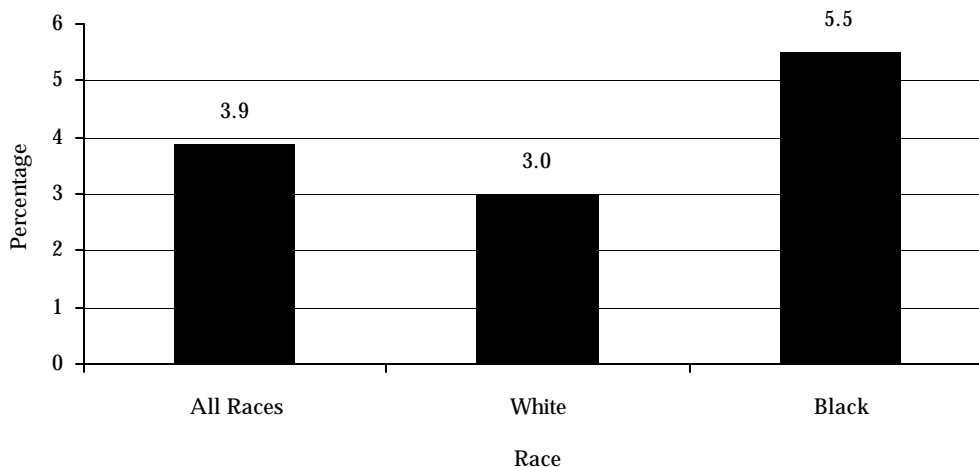
In Nashville during the year 2000, 3.9% of pregnant females in Nashville received either late or no prenatal care. Examining the data by race shows that blacks have the highest percentage of females receiving either no or late prenatal care (5.5%). (See Figure 94.)

The pregnant teen population aged 10-19 has a higher percentage of late or no prenatal care than all pregnant females in Nashville (Figure 95). Overall, 6.7% of teen mothers are either starting care during the third trimester of pregnancy, or receiving no prenatal care. Blacks have a higher percentage of teens not receiving adequate prenatal care (8%), than whites (4.9%).

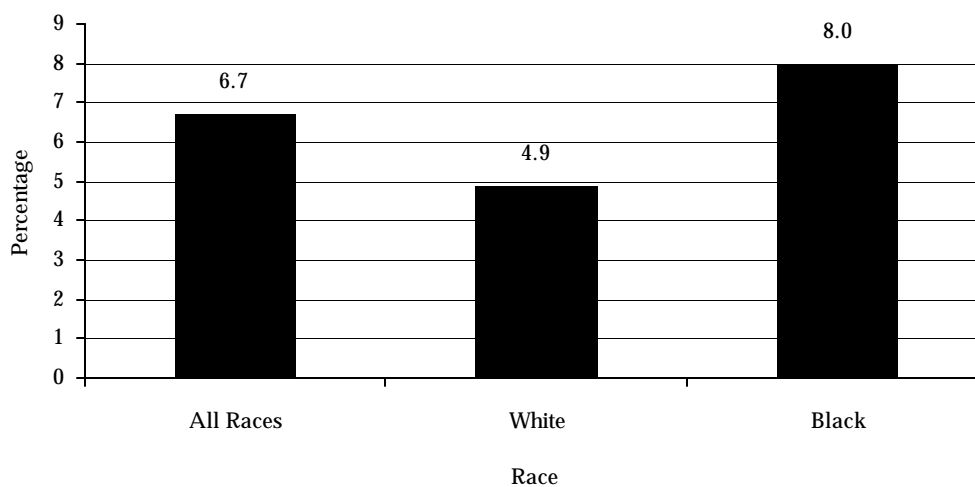
Comparing the percentages of females receiving late or no prenatal care in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 96). Shelby County has the highest percentage of females either starting care during the third trimester of pregnancy or receiving no care (8.0%). Nashville has a percentage (3.9%) equal to that of the U.S. (3.9%), and less than that of Tennessee (4.1%). Of all the areas compared, Knox County has the lowest percentage (2.9%) of pregnant females not receiving adequate care.

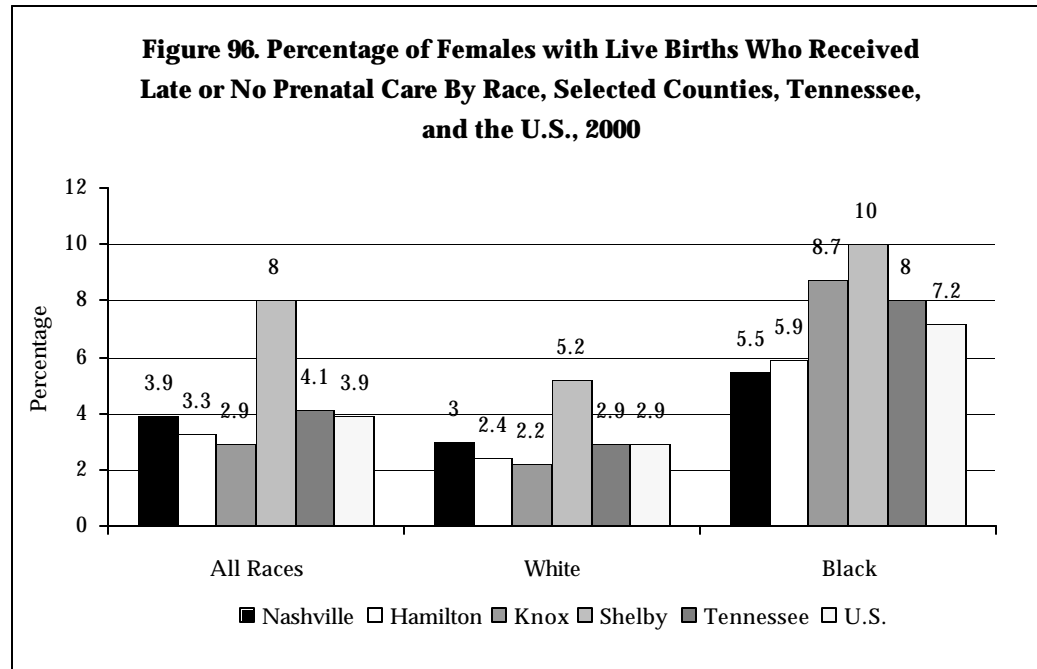
Blacks have the highest percentage of females receiving either no or late prenatal care. The pregnant teen population aged 10 - 19 has a higher percentage of no or late prenatal care than all pregnant females in Nashville.

**Figure 94. Percentage of Females with Live Births Who Did Not Receive Prenatal Care or Began Care during the Third Trimester of Pregnancy by Race, Nashville, TN, 2000**



**Figure 95. Percentage of Teen Females Aged 10-19 with Live Births Who Did Not Receive Prenatal Care or Began Care during the Third Trimester by Race, Nashville, TN, 2000**



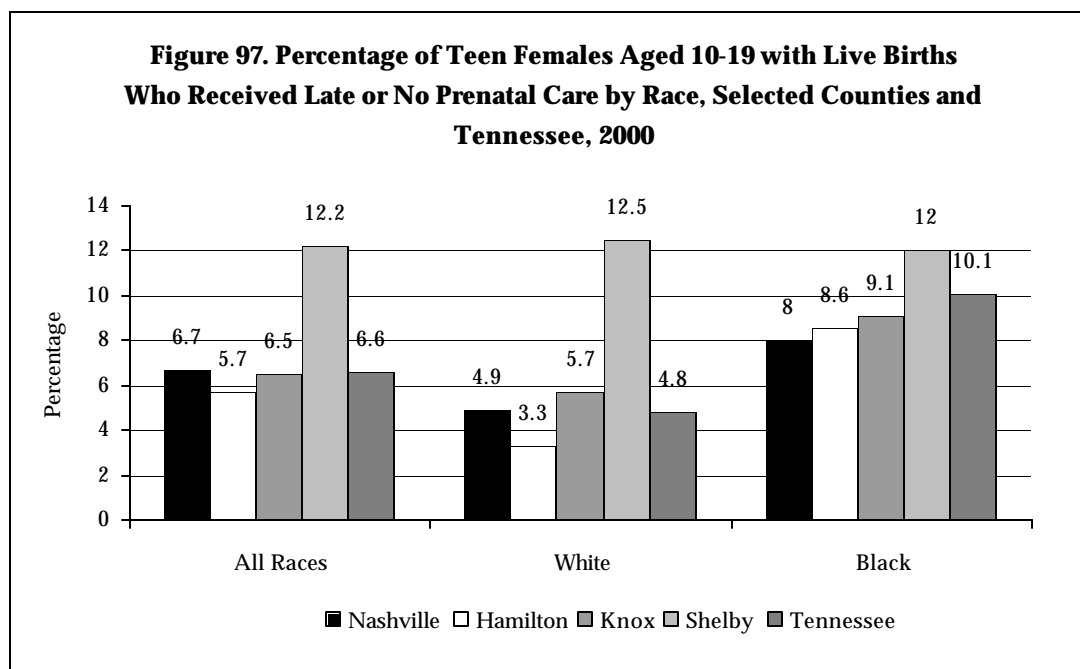


Examining the differences in late and no prenatal care by race shows that Shelby County has the highest percentage for whites (5.2%) and blacks (10.0%). All areas being compared have higher percentages of black females not receiving adequate prenatal care than white females. For whites, Nashville has a percentage (3.0%) nearly equivalent to that of Tennessee (2.9%) and the U.S. (2.9%). For blacks, Nashville has the lowest percentage of females receiving late or no prenatal care (5.5%) of all geographic areas compared, including Tennessee (8.0%) and the U.S. (7.2%).

Comparing the percentages of teen females aged 10-19 receiving late or no prenatal care in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S., yields further information (Figure 97). Shelby County has the highest percentage of teen females either starting care during the third trimester of pregnancy or receiving no care (12.2%). Nashville has a percentage (6.7%) slightly higher than that of Tennessee (6.6%). Of all the areas compared, Hamilton County has the lowest percentage (5.7%) of pregnant teens not receiving adequate care.

Examining the differences among teen females receiving late and no prenatal care by race shows that Shelby County has the highest percentage for whites (12.5%) and blacks (12.0%). (See Figure 97.) All areas being compared have higher percentages of black females not receiving adequate prenatal care than white females, excluding Shelby County. For white teen females, Nashville has a percentage (4.9%) nearly equivalent to that of Tennessee (4.8%). For blacks, Nashville has the lowest percentage of females receiving late or no prenatal care (8.0%) of all geographic areas compared, including Knox County (9.1%), and Tennessee (10.1%).





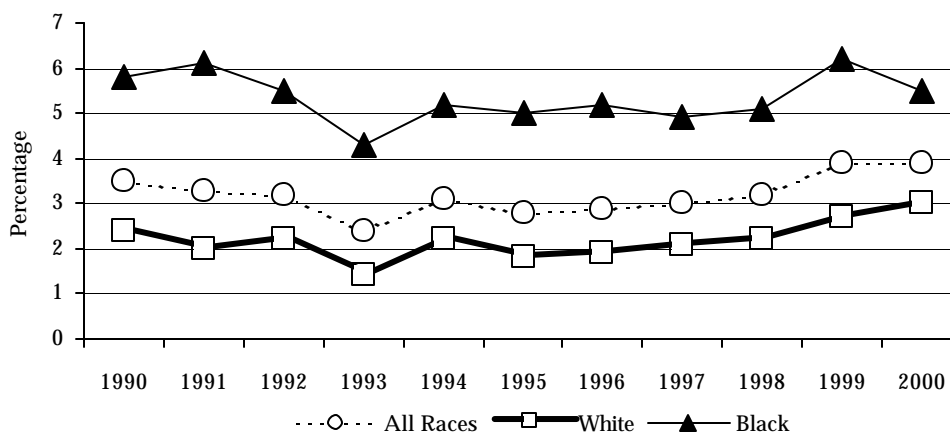
According to national data, the percentage of pregnant females who do not receive prenatal care is increasing.<sup>2</sup> As shown in Figure 98, the percentages of females either entering care during the third trimester of pregnancy or receiving no care has been slowly increasing since 1990. Blacks have the greatest percentage of females receiving late or no prenatal care followed by females of other races. Whites have the lowest percentages of all the comparisons. There is a slight downward turn for the year 2000, but it is unknown if this is an aberrant phenomenon or a precursor of things to come.

At first glance, the line graph depicting the trend of late or no prenatal care among females aged 10-19 is not nearly as smooth as the previous graph (Figure 99). The relative ranking mimics that seen among all pregnant females in Nashville. Blacks have the highest percentages, and whites have the lowest. 1998 is the only year that the black percentages become lower than the white percentages. Points of interest in this graph are the decreasing peaks in 1993 and 1998. It appears that each reduction in the percentage of teens receiving little or no prenatal care is followed in subsequent years by a corresponding increase in percentage. The last downward peak was in 1998. The percentages increased in 1999, and continue to increase for 2000.

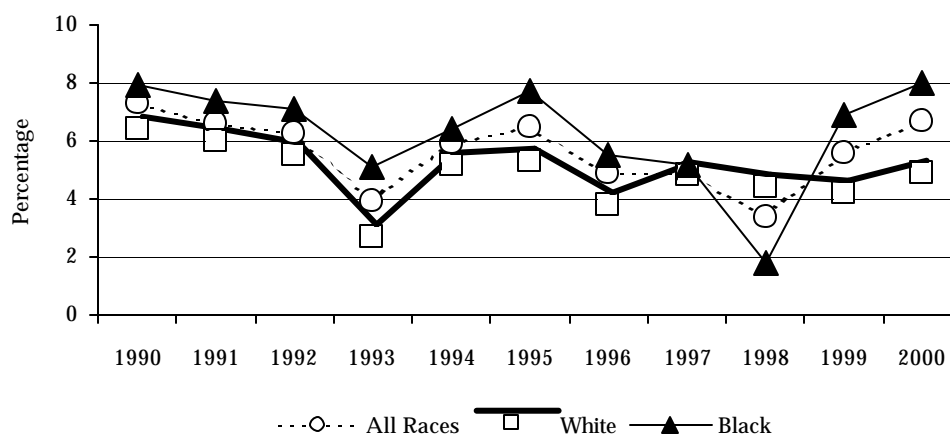
### Discussion

Early and adequate prenatal care improves the likelihood of giving birth to a healthy infant. The percentage of pregnant females receiving early care in Nashville is higher than the percentages for Tennessee and the U.S. In 2000, 84% of pregnant females in Nashville received prenatal care during the first trimester; 86% of whites, 82.1% of blacks, and 77% of females of other races. In order to achieve the Healthy People objective of 90% by the year 2010, Nashville will need to increase the number of pregnant women receiving early care by 7%; 4.7% for whites, 9.6% for blacks, and 16.9% for females of other races.

**Figure 98. Percentage of Females with Live Births Who Received No Prenatal Care or Started Care during the Third Trimester by Race, Nashville, TN, 1990-2000**



**Figure 99. Percentage of Teen Females Aged 10-19 with Live Births Who Received No Prenatal Care or Entered Care during the Third Trimester by Race, Nashville, TN, 1990-2000**



The percentage of pregnant females receiving early care in Nashville is higher than the percentages for Tennessee and the U.S.

The percentage of females aged 10 - 19 entering prenatal care is not as encouraging. Nashville's percentage of 74.4% is lower than the percentages of Hamilton, Knox, and Shelby Counties, as well as the percentage for Tennessee. Contrary to the trend overall, the percentage of black teens entering first trimester prenatal care is higher than the percentage of white teens. Teen females of other races have the lowest percentage of first trimester prenatal care. In order to achieve the Healthy People 2010 objective for teen females, Nashville will need to increase the number of pregnant teens receiving early care by 21%; 22% for white teens, 18.9% for black teens, and 53.6% for teens of other races.

For Nashville to improve the percentage of pregnant females receiving first trimester prenatal care, it will be important to identify the barriers that prevent pregnant females from accessing care. It is highly likely that the barriers for entry into early prenatal care are different for pregnant teens compared to older pregnant women. Further research is needed to identify and subsequently address those issues.

Although MPHD does not offer direct prenatal care services, pregnant women who meet the eligibility requirements may apply for the Women, Infants, and Children program (WIC). WIC participants receive nutritional counseling and supplemental nutritious foods, as well as screening and referrals to other health, welfare, and social services. Further information may be obtained at MPHD's website, <http://healthweb.nashville.org>.

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The percentage of females aged 10 - 19 entering prenatal care is not as encouraging. Nashville's percentage of 74.4% is lower than the percentages of Hamilton, Knox, and Shelby Counties, as well as the percentage for Tennessee.

## Related Indicators

- Teen births
- Prenatal care
- Low birth weight
- Educational attainment
- Household income

### 3.2.4 Perinatal and Infant Mortality

#### Background

The death of a child is a complex issue related to a wide range of factors such as socioeconomic conditions, maternal lifestyle and health, access to and acceptability of medical care, and availability of services. Since fetal and infant mortality are related to many important issues, these measures are often used as indicators of the overall health of a community.

Fetal death, also referred to as stillbirth, has been officially defined by the World Health Organization (WHO) as “death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.”<sup>1</sup> States, however, differ on the recording requirements for fetal death. Tennessee requires all fetal deaths 500 grams and greater to be recorded. If the birth weight is unknown, then the fetal death must be at least 22 weeks of gestation.<sup>2</sup> The fetal death rate is calculated by dividing the number of fetal deaths in a year by the number of live births plus fetal deaths in that same year and multiplying the quotient by 1000.<sup>3</sup>

## Additional Data

Appendices  
pages D-49 - D-50

Infant mortality has a much clearer definition. It is defined as the death of a child before his or her first birthday. This indicator is further divided into two categories: neonatal mortality and postneonatal mortality. Neonatal mortality refers to the death of a child aged 0-27 days. Postneonatal mortality refers to the death of a child aged 28-364 days. The infant mortality rate is calculated by dividing the number of infant deaths in a time period by the number of live births in that same time period and multiplying the quotient by 1000.<sup>3</sup>

#### Findings

##### *Fetal Mortality*

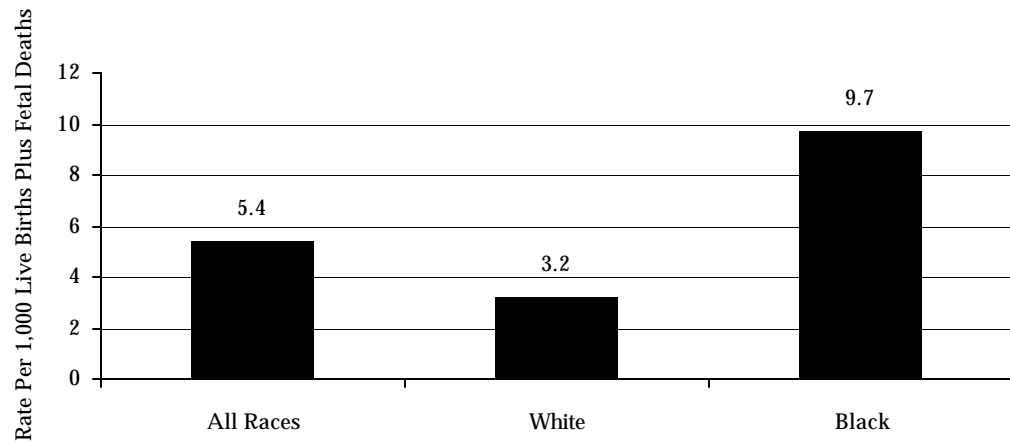
The most recent fetal death data is from 1998 (Figure 100). In that year, the mortality rate for all races in Nashville was 5.4 per 1,000 live births plus fetal deaths. There is a very large disparity between blacks and whites. In 1998, blacks had a fetal mortality rate of 9.7 deaths per 1,000 live births plus fetal deaths, compared to whites with a fetal mortality rate of 3.2 deaths per 1,000 live births plus fetal deaths. Black fetuses are 3 times more likely to die than white fetuses.

The Healthy People 2010 objective is to reduce fetal mortality to 4.1 deaths per 1,000 live births plus fetal deaths. If we examine the trend for fetal mortality rates from 1990 to 1998 in Nashville, it appears that fetal mortality is worsening instead of improving (Figure 101). Since 1994, the disparity between blacks and whites appears to be getting larger, and the rate of fetal deaths for blacks is increasing. White rates have been consistently lower than the 2010 objective since 1995, and demonstrate no signs of increasing above the objective.

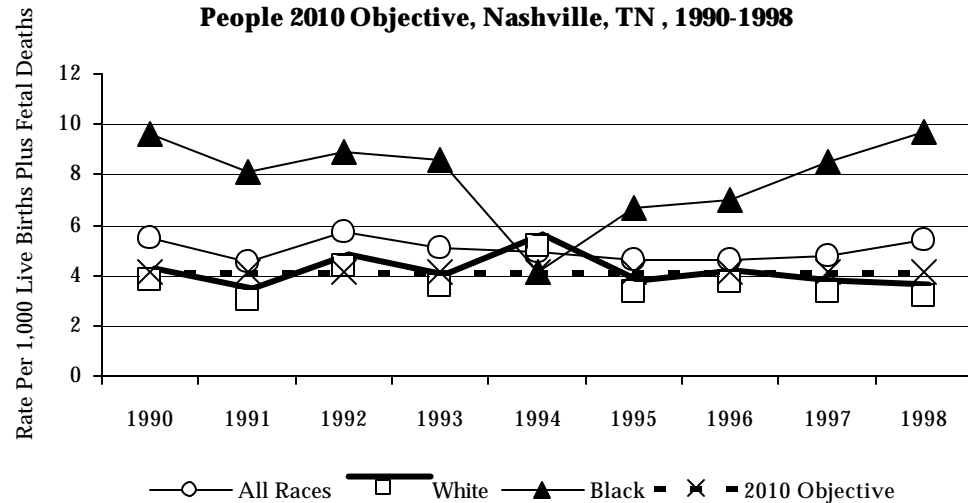
## Data Sources

- Metro Public Health Department
- Tennessee Department of Health

**Figure 100. Fetal Mortality Rates by Race of Mother, Nashville, TN, 1998**



**Figure 101. Fetal Mortality Rates by Race Compared to the Healthy People 2010 Objective, Nashville, TN, 1990-1998**

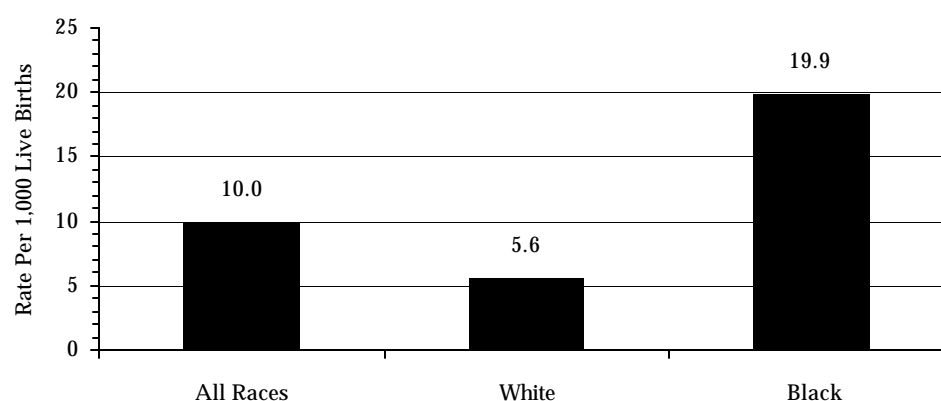


In 1998, black fetuses were 3 times more likely to die than white fetuses.

### Infant Mortality

In the year 2000, the infant mortality rate for Nashville was 10.0 per 1,000 live births. When examined by race, a disparity between the rates for blacks and whites appears. White infants died at the rate of 5.6 per 1,000 live births, while black infants died at the rate of 19.9 per 1,000 live births. This means that black infants born in Nashville are 3.6 times more likely to die than white infants (Figure 102).

**Figure 102. Infant Mortality Rates By Race of Mother, Nashville, TN, 2000**

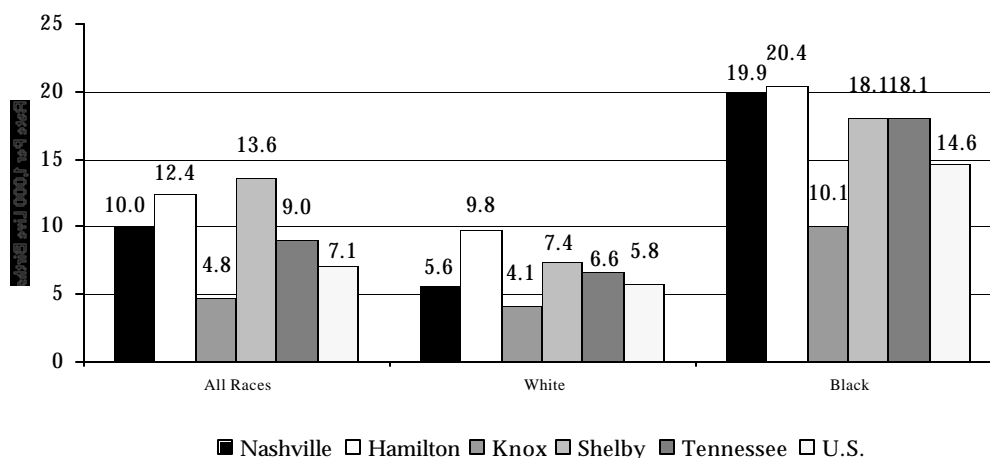


Black infants born in Nashville are 3.6 times more likely to die than white infants.

Comparing the infant mortality rates in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S., yields some important observations (Figure 103). All rates discussed are per 1,000 live births. Overall, Shelby County has the highest infant mortality rate (13.6), followed by Hamilton County (12.4). The infant mortality rate in Nashville is higher than the rate for either Tennessee (9.0) or the U.S. (7.1). Knox County has the lowest infant mortality rate of all areas compared (4.8).

Examining the differences in infant mortality rates by race reveals a large disparity between whites and blacks. This disparity is evident in all of the areas under comparison. Hamilton County has the highest rate for whites (9.8), followed by Shelby County (7.4). The infant mortality rate in Nashville for whites (5.6) is lower than both the rates for Tennessee (6.6) and the U.S. (5.8). Knox County has the lowest white infant mortality rate of all the areas compared (4.1). For blacks, Hamilton County has the highest infant mortality rate (20.4) followed closely by Nashville (19.9). Nashville has a higher black infant mortality rate than Shelby County (18.1), Tennessee (18.1), and the U.S. (14.6). Knox County has the lowest black infant mortality rate of all the areas compared (10.1).

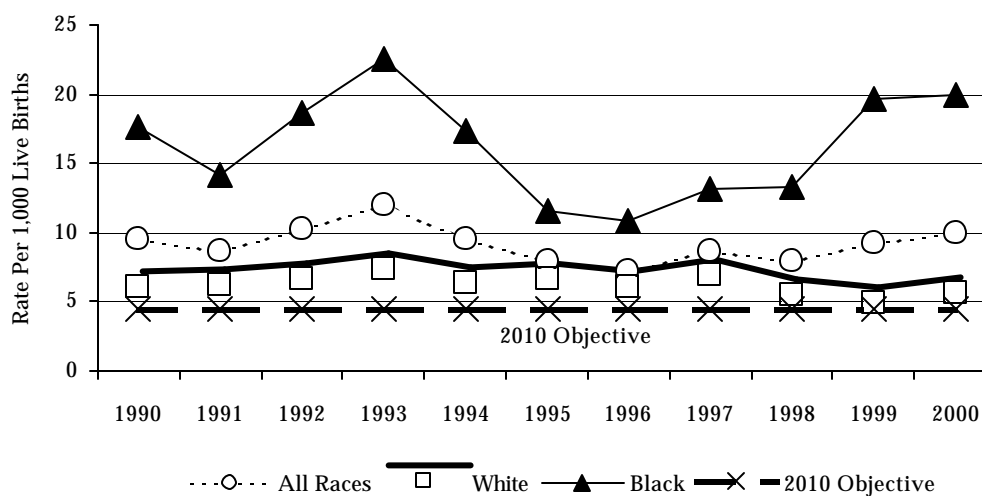
**Figure 103. Infant Mortality Rates Per 1,000 Live Births, by Race of Mother, Tennessee and Selected Counties, 2000, and the U.S., 1999**



Infant mortality rates in Nashville through the past decade are not improving.

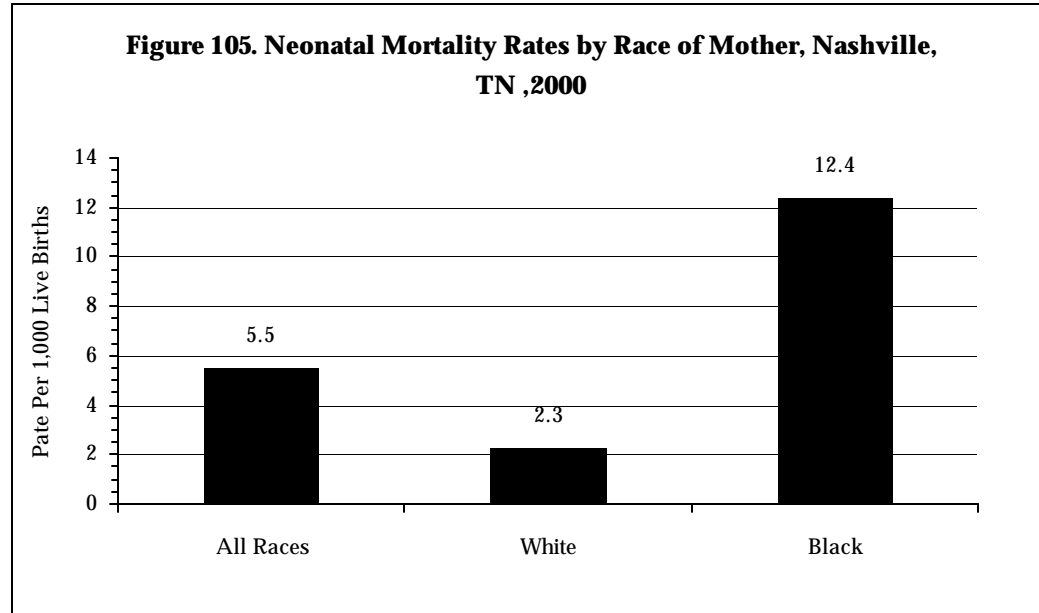
The Healthy People 2010 objective is to reduce infant mortality to 4.5 deaths per 1,000. Examining infant mortality rates through the past decade, as depicted in Figure 104, indicates that rates in Nashville are not improving. Infant mortality rates for all races are greater than the 2010 goal. Blacks have had the highest rate of infant mortality during the past decade, while whites have consistently had the lowest infant mortality rate. The white infant mortality rate appears to be stable at approximately 6 deaths per 1,000 live births, but the rate for blacks appears to have great variability.

**Figure 104. Infant Mortality Rates by Race of Mother Compared to the Healthy People 2010 Objective, Nashville, TN, 1990-2000**



### Neonatal Mortality

Infant mortality is composed of two parts – neonatal mortality and postneonatal mortality. Neonatal mortality refers to the death of children aged 27 days and less. In 2000, Nashville had a neonatal mortality rate of 5.5 per 1,000 live births. White neonates die at the rate of 2.3 per 1,000 live births while neonatal black babies die at the rate of 12.4 per 1,000. Black neonates are 5.4 times more likely to die than white neonates (Figure 105).



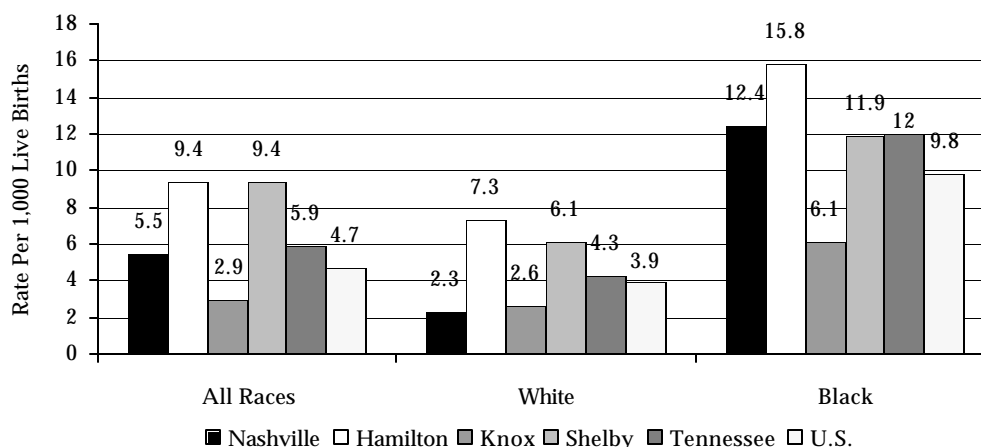
Black neonates are 5.4 times more likely to die than white neonates.

Comparing the neonatal mortality rates in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 106). All rates discussed are per 1,000 live births. Overall, Shelby and Hamilton Counties have the highest neonatal mortality rates (9.4). The neonatal mortality rate in Nashville is higher than the rate for the U.S. (4.7), but is lower than the rate for Tennessee (5.5). Knox County has the lowest neonatal mortality rate of all areas compared (2.9).

Examining the differences in neonatal mortality rates by race reveals a large disparity between whites and blacks. This disparity is evident in all of the areas under comparison. Hamilton County has the highest rate for whites (7.3) followed by Shelby County (6.1). The neonatal mortality rate in Nashville for whites (2.3) is lower than both the rates for Tennessee (4.3), and the U.S. (3.9). Nashville has the lowest white neonatal mortality rate of all the areas compared (2.3). For blacks, Hamilton County has the highest neonatal mortality rate (15.8) followed by Nashville (12.4). Nashville has a higher black neonatal mortality rate than Shelby County (11.9), Tennessee (12.0), and the U.S. (9.8). Knox County has the lowest black neonatal mortality rate of all the areas compared (6.1).



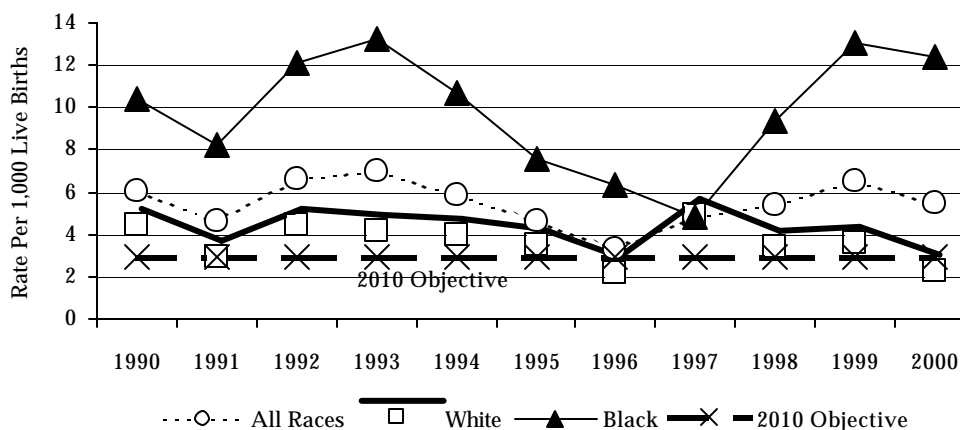
**Figure 106. Neonatal Mortality Rates Per 1,000 Live Births, by Race of Mother, Tennessee and Selected Counties, 2000, and the U.S., 1999**



In general, the neonatal mortality rates for Nashville are twice as high as the 2010 objective; the black neonatal mortality rate is nearly 4 times higher than the objective.

The Healthy People 2010 Objective is to reduce the neonatal mortality rate to 2.9 deaths per 1,000 live births. Examining neonatal mortality rates through the past decade, in comparison to the Healthy People 2010 Objective, reveals that white neonates achieved the goal in the year 2000 (Figure 107). It is unknown if the white neonatal mortality rate will remain below the goal. Blacks have the highest rate of neonatal mortality, while whites have the lowest. In general, the neonatal mortality rates for Nashville are twice as high as the 2010 objective; the black neonatal mortality rate is nearly 4 times higher than the objective.

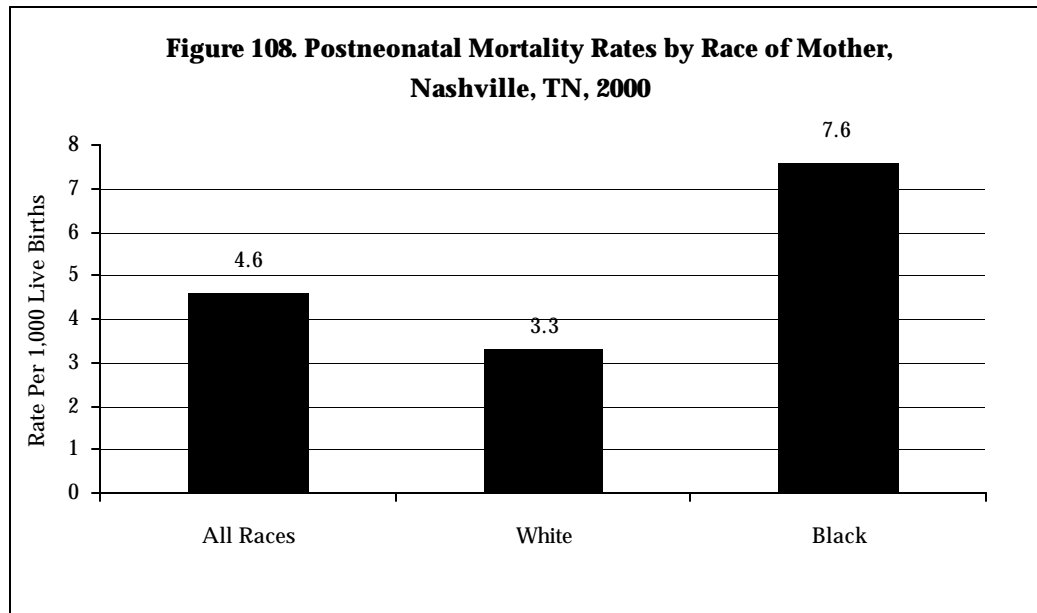
**Figure 107. Neonatal Mortality Rates by Race of Mother Compared to the Healthy People 2010 Objective, Nashville TN, 1990-2000**



Black postneonates are approximately twice as likely to die than white postneonates.

### ***Postneonatal Mortality***

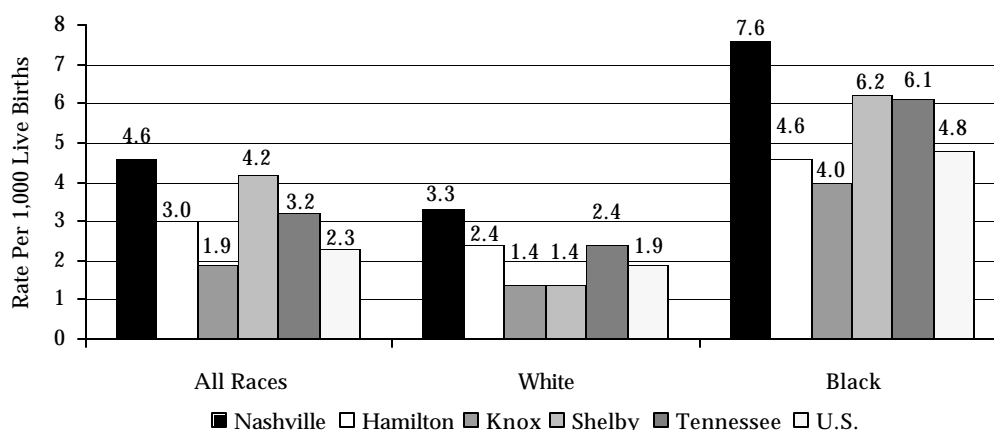
Postneonatal mortality is defined as deaths occurring to children between 28 and 364 days old. For all races combined, Nashville had a postneonatal mortality rate of 4.6 deaths per 1,000 live births in the year 2000. Once again, a disparity between whites and blacks is evident. White postneonates died at the rate of 3.3 per 1,000 live births during 2000, while black postneonates died at the rate of 7.6 per 1,000 live births. Black postneonates are approximately twice as likely to die than white postneonates (Figure 108).



Comparing the postneonatal mortality rates in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S., yields some important observations (Figure 109). All rates discussed are per 1,000 live births. Overall, Nashville has the highest postneonatal mortality rate (4.6), followed closely by Shelby County (4.2). The postneonatal mortality rate in Hamilton County (3.0) is higher than that of the U.S. (2.3), but lower than the Tennessee rate (3.2). Knox County has the lowest postneonatal mortality rate of all areas compared (1.9).

Examining the differences in postneonatal mortality rates by race reveals a large disparity between whites and blacks. This disparity is evident in all of the areas under comparison. Nashville has the highest postneonatal mortality rate for whites (3.3), followed by Hamilton County and Tennessee (2.4). Knox and Shelby Counties have the lowest postneonatal mortality rates for whites (1.4). For blacks, Nashville has the highest postneonatal mortality rate (7.6) followed by Shelby County (6.2), and Tennessee (6.1). Knox County has the lowest black postneonatal mortality rate of all the areas compared (4.0).

**Figure 109. Postneonatal Mortality Rates Per 1,000 Live Births, by Race of Mother, Tennessee and Selected Counties, 2000, and the U.S., 1999**

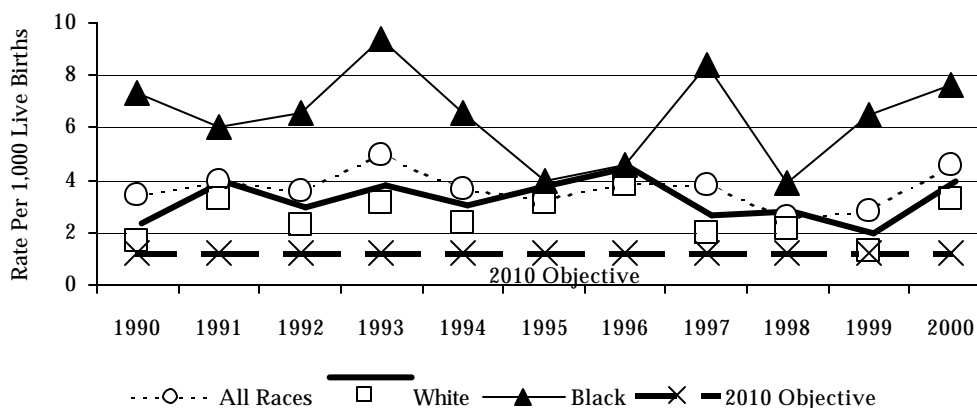


Overall, postneonatal mortality in Nashville is approximately 4 times higher than the objective in 2000.

The Healthy People 2010 Objective is to reduce the postneonatal mortality rate to 1.2 deaths per 1,000 live births. Examining postneonatal mortality rates through the past decade in comparison to the Healthy People 2010 Objective reveals that no group in Nashville has met this goal (Figure 110). Overall, postneonatal mortality in Nashville is approximately 4 times higher than the objective in 2000. The rate for whites is nearly 3 times higher than the objective, and the rate for blacks is approximately 6 times higher than the 2010 objective during the year 2000.

The trend for postneonatal deaths is similar to the trend for infant mortality. The relative ranking indicates that black postneonates are more likely to die than white neonates, and whites consistently have the lowest postneonatal mortality rates in Nashville. Since 1999, the postneonatal mortality rate has been increasing for all groups.

**Figure 110. Postneonatal Mortality Rates by Race of Mother, Compared to the Healthy People 2010 Objective, Nashville, TN, 1990-2000**



***Leading Causes of Neonatal Mortality (Aged 0 to 27 Days)***

In Nashville during the year 2000, the primary cause of death for neonates, children aged 0-27 days, was disorders related to short gestation and low birth weight, not elsewhere classified. As shown in Table 20, sixteen neonates died from this cause of death. The second leading cause of death in 2000 was respiratory distress of the newborn with 5 deaths. Low birth weight and prematurity accounted for 33%, or one-third, of all neonatal deaths.

**Table 20. Leading Causes of Neonatal Mortality (Infants Aged 0 to 27 Days), Nashville, TN, 2000.**

Rank	Cause of Death	Deaths
1	Disorders related to short gestation and low birth weight, not elsewhere classified	16
2	Respiratory distress of newborn	5
3	Bacterial sepsis of newborn	3
3	Neonatal hemorrhage	3
4	Congenital malformations of heart	2
4	Other congenital malformations of nervous system	2
4	Newborn affect by chorioamnionitis*	2
4	Interstitial emphysema and related conditions originating in the perinatal period	2

\*Chorioamnionitis is defined by Steadman's Medical Dictionary (25th edition) as an infection involving the fetal membranes and amniotic fluid.

Data Source: Tennessee Department of Health

Infant and fetal mortality rates in Nashville have not improved over the past 10 years.

***Leading Causes of Postneonatal Mortality in Infants (Aged 28 to 364 Days)***

As shown in Table 21, the leading cause of death for infants aged 28 to 364 days in 2000 was Sudden Infant Death Syndrome, commonly referred to as SIDS. SIDS is defined as "the sudden death of an infant under 1 year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of clinical history".<sup>4</sup> Although a diagnosis of exclusion, SIDS accounted for 24% of all postneonatal deaths in Nashville in the year 2000. The second leading causes of death for this age group were congenital malformations of the heart and other and unspecified diseases of the respiratory system, each with 4 deaths.

**Discussion**

Infant and fetal mortality rates in Nashville did not improve between 1990 and 2000. The fetal mortality rate of 5.4 deaths per 1,000 live births plus fetal deaths in 2000 was 24% higher than the Healthy People 2010 objective of 4.1 deaths per 1,000 live births plus fetal deaths. Nashville's infant mortality rate of 10.0 deaths per 1,000 live births was 55% higher than the Healthy People 2010 objective of 4.5 deaths per 1,000 live births. Additionally, Nashville's infant mortality rate was higher than the rates for Tennessee and the U.S.

**Table 21. Leading Causes of Postneonatal Mortality (Infants Aged 28 to 364 Days), Nashville, TN, 2000**

Rank	Cause of Death	Deaths
1	Sudden Infant Death Syndrome (SIDS)	10
2	Congenital malformations of heart	4
2	Other and unspecified diseases of respiratory system	4
3	Septicemia	3
4	Pneumonia	2
4	Chronic respiratory disease originating in the perinatal period	2
4	Accidental suffocation and strangulation in bed	2

Data source: Tennessee Department of Health

Infant and fetal mortality rates among blacks are increasing, although the rates among whites have demonstrated little variability for the past ten years, resulting in an increased disparity between blacks and whites. The black fetal mortality rate of 9.7 deaths per 1,000 live births plus fetal deaths is 203% higher than the white rate of 3.2. The black infant mortality rate of 19.9 deaths per 1,000 live births is 255% higher than the white rate of 5.6. Nashville's black infant mortality rate is higher than the rates for Tennessee and the U.S.

The leading cause of death differs according to the age of the child at death. For instance, the leading cause of death among neonates, children aged 0 - 27 days, is disorders related to low birth weight and prematurity. Children aged 28 - 364 days, postneonates, predominately die from SIDS.

MPHD addresses infant mortality and its underlying causes through a variety of services and programs. Through the Back to Sleep Campaign, MPHD provides education on safe sleeping environments to infants in order to prevent SIDS. The Car Safety program provides education and low cost child restraints to reduce the risk of death for infants riding in a vehicle. The Healthy Start Home Visiting Program and the Help Us Grow (HUG) program address child abuse and neglect, as well as other health issues through in-home education and intensive case management services. For more information on the services offered by MPHD, please visit the website, <http://healthweb.nashville.org>.

#### References:

1. Public Health Service. *International Recommendations on Definitions of Live Birth and Fetal Death*. Washington, DC: U.S. Department of Health, Education, and Welfare; 1950
2. Tennessee Department of Health. *Tennessee Vital Statistics*. 1999.
3. Last, JM, ed. *A Dictionary of Epidemiology*. 2nd ed. New York: Oxford University Press; 1998.

MPHD addresses infant mortality and its underlying causes through a variety of services and programs.

## Related Indicators

- Teen births
- Prenatal care
- Perinatal and infant mortality
- Preterm birth

### 3.2.5 Low Birth Weight

#### Background

Low birth weight is defined as a weight at birth of less than 2,500 grams or 5 pounds 8 ounces. Birth weight has a strong association with both mortality and morbidity. Research indicates a death during the neonatal period is nearly 40 times more likely to occur among low birth weight infants than infants of normal weight.<sup>1</sup> Additionally, children born at low birth weight are at an increased risk of general morbidity and other disorders such as severe mental retardation and neurological problems.<sup>1</sup>

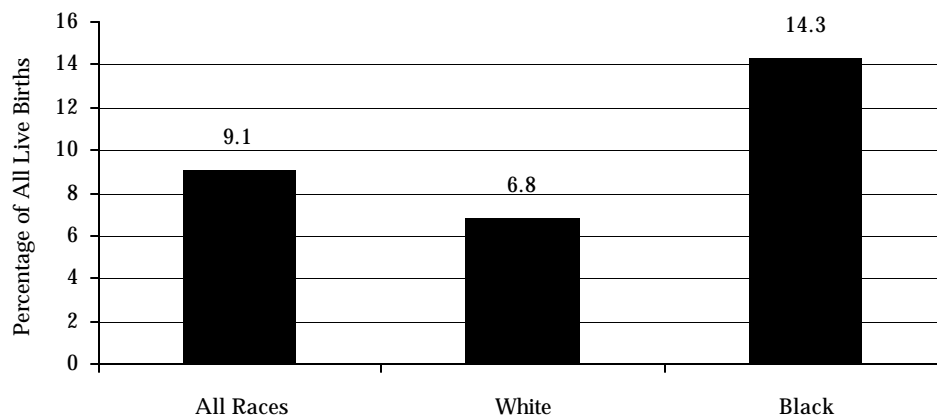
#### Findings

In Nashville, 9.1% of all live births during the year 2000 weighed less than 2,500 grams. When stratified by race, 6.8% of whites born that year were low birth weight compared to 14.3% of blacks (Figure 111).

## Additional Data

Appendices  
pages D-51 - D-52

**Figure 111. Percentage of All Live Births Born Low Birth Weight by Race of Mother, Nashville, TN, 2000**



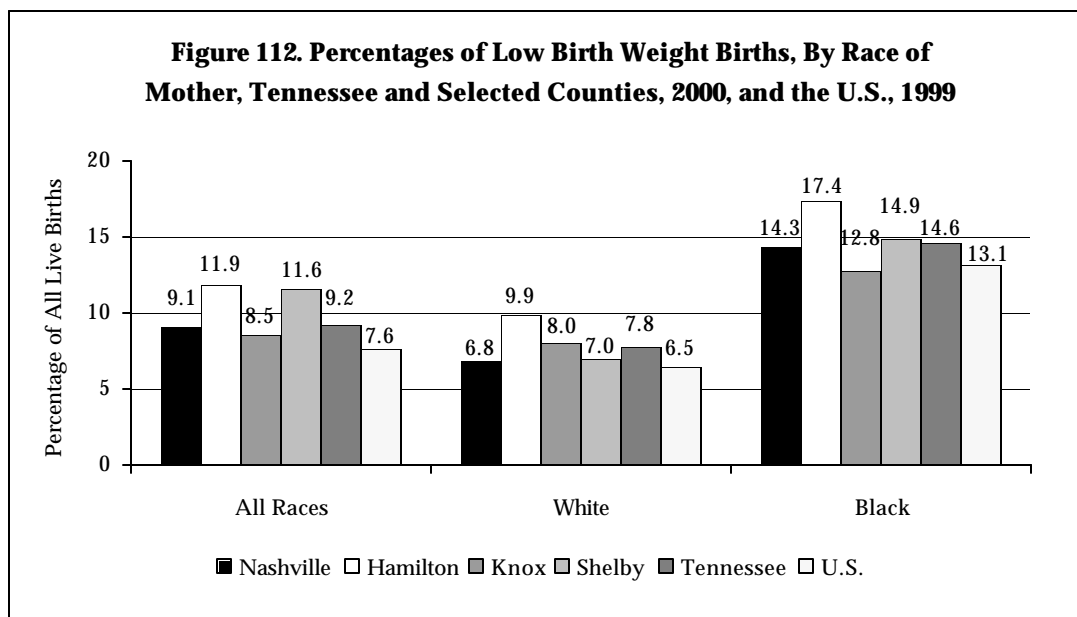
Comparing the percentages of low birth weight births in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 112). All percentages discussed are per all live births. Overall, Hamilton County has the highest percentage of low birth weight (11.9), followed closely by Shelby County (11.6). The percentage of low birth weight babies in Nashville (9.1) is nearly equivalent to that of Tennessee (9.2), but is significantly higher than the U.S. (7.6). Knox County has the lowest percentage of low birth weight births of all areas compared (8.5).

## Data Sources

Metro Public Health  
Department

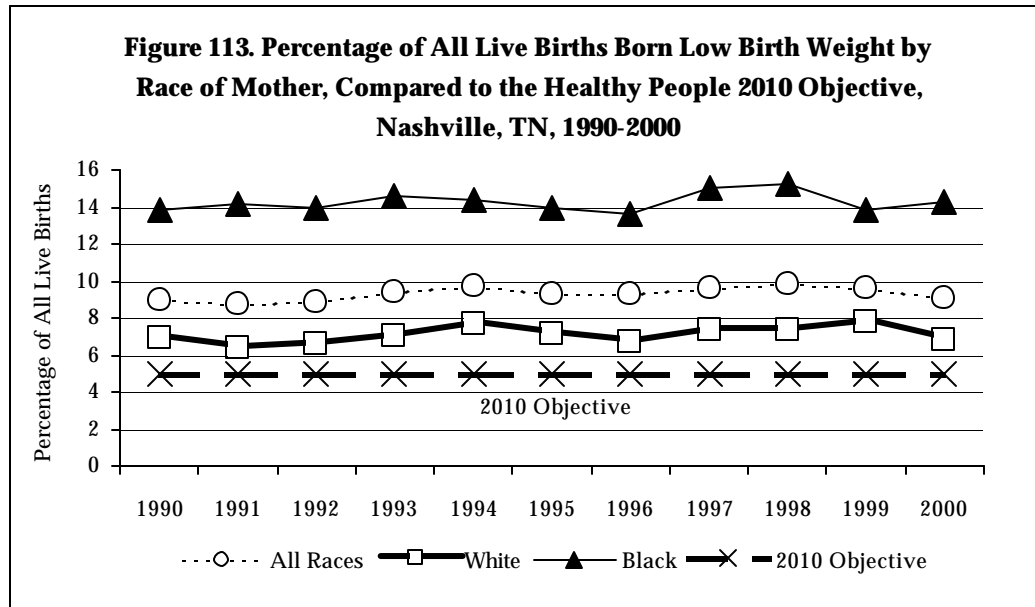
Examining the differences in percentage of low birth weight by race reveals a large disparity between whites and blacks. This disparity is evident in all of the areas under comparison. Hamilton County has the highest percentage of low birth weight babies for whites (9.9). The percentage of low birth weight in Nashville (6.8) is lower than the

percentage for Tennessee (7.8), but higher than the percentage for the U.S. (6.5). All areas in Tennessee under examination have percentages higher than the U.S.. For blacks, Hamilton County has the highest percentage of low birth weight babies (17.4) of all the areas compared. The percentage of black low birth weight babies in Nashville (14.3) is lower than the percentage for Tennessee (14.6), but higher than the U.S. percentage (13.1).



Nationally, there has been little change in the proportion of low birth weight babies over the past few decades.<sup>1</sup> The disparity between whites and blacks has remained fairly steady during the past decade, and Nashville's trend mimics the national trend. The percentage of black babies born less than 2,500 grams hovers between 14 and 15 percent. For whites, the proportion is smaller with only 6 to 8 percent of babies being born low birth weight. Overall, between 8 and 10 percent of births in Nashville each year weigh less than 2,500 grams. The Healthy People 2010 Objective for this indicator is to reduce the percentage of births weighing less than 2,500 grams to 5%. As indicated in Figure 113, there is much work needed in Nashville to achieve that goal by 2010.

Overall, between 8 and 10 percent of births in Nashville each year weigh less than 2,500 grams.



### Discussion

As noted in the previous chapter, low birth weight is one of the predominant causes of death for infants less than 28 days old. The percentage of infants born less than 2,500 grams in Nashville during the year 2000 was 9.1%, 45% higher than the Healthy People 2010 objective of 5%. Nashville's percentage of low birth weight babies during the year 2000 is higher than the U.S. percentage, but slightly less than the percentage for Tennessee.

There is a large disparity between blacks and whites for this indicator that has not improved over the past ten years. The black percentage of low birth weight infants in 2000, 14.3%, is 110% higher than the white percentage of 6.8.

In order to reduce Nashville's percentage of low birth weight infants, it will be necessary to address women's health issues both before and during pregnancy. MPHD addresses the issue of maternal smoking, for example, through the SMART MOMS program which offers smoking cessation education and counseling. MPHD also sponsors the Incredible Baby Shower in the fall each year, which informs, educates, and provides opportunities to learn about healthy pregnancies, infant and child development, safety and healthy child issues, parenting issues, and local resources.

### Reference:

1. Kiely JL, Brett KM, Yu S, Rowley DL. Low birth weight and intrauterine growth retardation. In: Wilcox, LS, Marks, JS, eds. *From Data to Action: CDC's Public Health Surveillance for Women, Infants, and Children*. U.S. Department of Health and Human Services; 1995.

Low birth weight is one of the predominant causes of death for infants less than 28 days old.



## Related Indicators

- Teen births
- Prenatal care
- Perinatal and infant mortality
- Low birth weight

### 3.2.6 Preterm Birth

#### Background

Preterm delivery is defined as the termination of pregnancy before the completion of the 37<sup>th</sup> week of gestation. Preterm birth is a major cause of low birth weight, and combined with low birth weight, is a predominant cause of infant mortality and morbidity.<sup>1</sup> The overall rate of preterm births is gradually increasing nationwide. Research indicates that from 1989 through 1996, there was a 4 percent increase in preterm delivery rates.<sup>2</sup> This phenomenon seems to be evident in industrialized nations around the world.<sup>2</sup> Although the exact causes of preterm birth are unknown, risk factors for preterm birth include low socioeconomic status, previous preterm delivery, smoking, and inadequate weight gain during pregnancy.

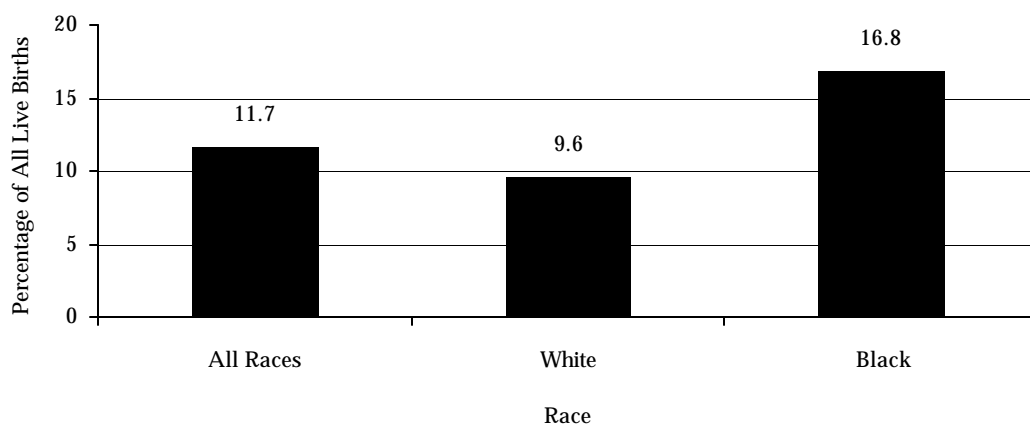
#### Findings

During the year 2000, 11.7% of babies born in Nashville were premature. When examined by race, 9.6% of white babies born that year were premature compared to 16.8% of black babies (Figure 114).

## Additional Data

Appendices  
pages D-51 - D-52

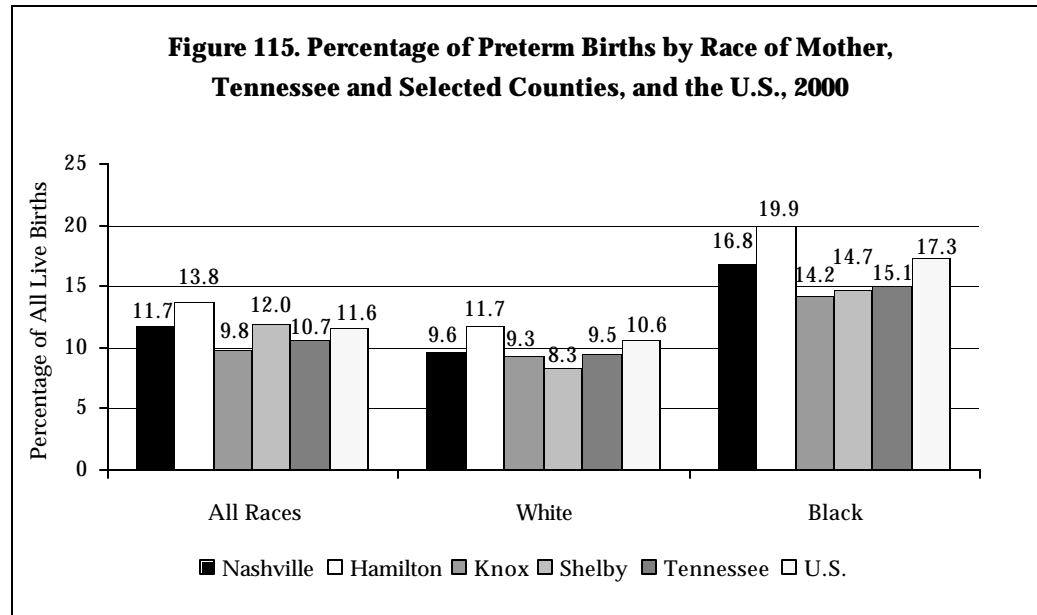
**Figure 114. Percent of Preterm Births by Race of Mother, Nashville, TN, 2000**



Comparing the percentages of preterm births in Nashville with those of three other metropolitan counties in Tennessee, namely Hamilton, Knox, and Shelby Counties, Tennessee, and the U.S. yields some important observations (Figure 115). All percentages discussed are per all live births. Overall, Hamilton County has the highest percentage of preterm births (13.8). The percentage of preterm births in Nashville (11.7) is nearly equivalent to the U.S. percentage (11.6), but is greater than that of Tennessee (10.7). Knox County (9.8) has the lowest percentage of preterm births of all areas compared.

## Data Sources

Metro Public Health  
Department



Blacks have the highest percentage of preterm births, and since 1990, that percentage has increased 28%.

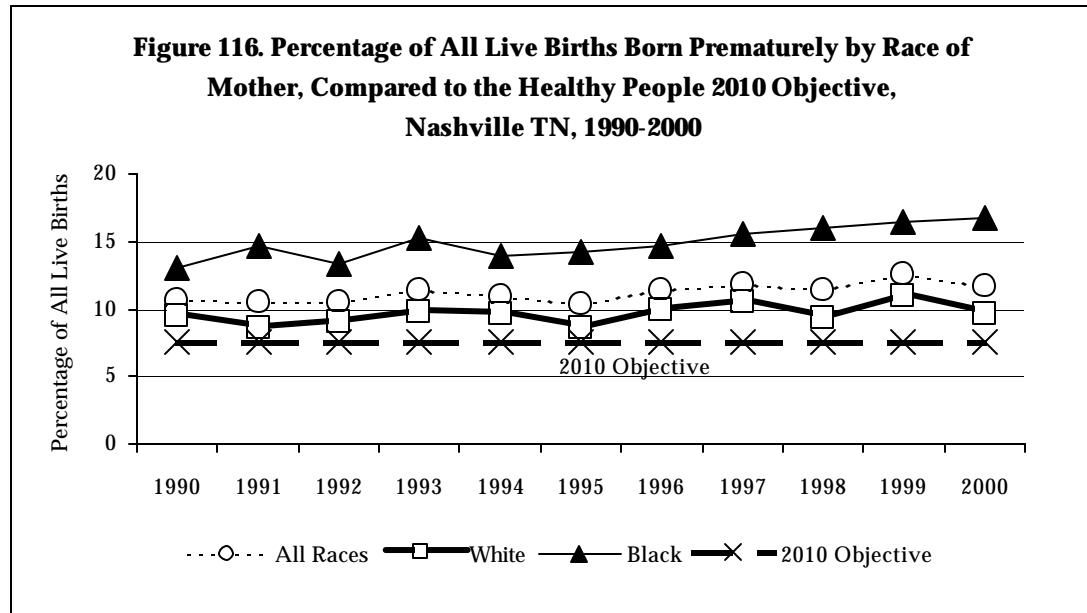
Examining the differences in percentage of preterm birth by race reveals a large disparity between whites and blacks. This disparity is evident in all of the areas under comparison. Hamilton County has the highest percentage of white preterm births (11.7). The percentage of preterm births in Nashville (9.6) is nearly equivalent to the percentage for Tennessee (9.5), and is lower than the percentage in the U.S. (10.6). Shelby County has the lowest percentage of preterm births for whites (8.3) of all the areas compared. For blacks, Hamilton County has the highest percentage of preterm births (19.9) of all the areas compared. The percentage of black preterm births in Nashville (16.8) is lower than the percentage for the U.S. (17.3), but higher than the Tennessee percentage (15.1). Knox County has the lowest percentage of preterm births for blacks (14.2) of all the areas compared.

During the 1990's, in the U.S. the number of preterm deliveries increased among whites by 8%, and the number for blacks decreased by 10%.<sup>2</sup> As depicted in Figure 115, the trend in Nashville does not mimic the national data. Blacks have the highest percentage of preterm births, and since 1990, that percentage has increased 28%. The percentage of preterm births has also been increasing for whites since 1990, but the degree of increase is considerably less than that for blacks.

The Healthy People 2010 objective is to reduce the percentage of preterm births to 7.6 percent. As is indicated in Figure 116, Nashville falls short of this goal on all accounts. Overall, Nashville exceeds the 2010 goal by 35%. Whites exceed the goal by nearly 21%, and blacks exceed the goal by nearly 55%.

### Discussion

Preterm birth, combined with low birth weight, is the leading cause of death of infants less than 28 days old. The percentage of all live birth babies born prematurely in Nashville during 2000 was 11.7%. This percentage is 35% higher than the Healthy People 2010 objective of 7.6%. Nashville's percentage of preterm births in 2000 was higher than the percentage for Tennessee and the U.S.



There is a large disparity between blacks and whites for this indicator that is not improving. The black percentage of preterm births in 2000 (16.8%) was 75% higher than the white percentage of 9.6%.

In order to reduce premature birth in Nashville, it will be necessary to address women's health issues both before and during pregnancy. Many of the programs discussed in Section 3.2.5 also address issues of preterm delivery. Education regarding general health issues coupled with information regarding the signs and symptoms of preterm delivery are included in such programs as Help Us Grow (HUG), Healthy Start, and the Incredible Baby Shower.

#### References:

1. Blackmore CA, Rowley DL, Kiely JL. Preterm birth. In: Wilcox, LS, Marks, JS, eds. *From Data to Action: CDC's Public Health Surveillance for Women, Infants, and Children*. U.S. Department of Health and Human Services; 1995.
2. Demissie K, Rhoads GG, Ananth CV, Alexander GR, Kramer MS, Kogan MD, Joseph KS. Trends in preterm birth and neonatal mortality among blacks and whites in the United States from 1989 to 1997. *Am J Epidemiol*. 2001;154:307-15.

Preterm birth is a major cause of low birth weight, and combined with low birth weight, is a predominant cause of infant mortality and morbidity. The black percentage of preterm births in 2000 (16.8%) was 75% higher than the white percentage of 9.6%.

## Related Indicators

- Prenatal care
- Fertility

### 3.2.7 Maternal Mortality

#### Background

A maternal death is “the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.”<sup>1</sup> Maternal mortality is measured by the maternal mortality ratio. The maternal mortality ratio is calculated by dividing the number of deaths in a specified time period by the number of live births in the same time period and multiplying the quotient by 100,000.<sup>1</sup>

According to the Centers For Disease Control and Prevention (CDC), in the early 1900's the maternal mortality ratio in the United States ranged from 600 to 900 deaths per 100,000 live births.<sup>2</sup> During the 20<sup>th</sup> century, improvements in obstetrics and other medical practices, nutrition, and better access to care and education all contributed to a drastic reduction in maternal mortality.<sup>2</sup> In 1999, the maternal mortality ratio in the United States was 9.9 deaths per 100,000 live births. The maternal mortality ratio in the United States for whites was 6.8 deaths per 100,000 live births; for blacks, it was 25.4 deaths per 100,000 live births. Black mothers were 3.7 times more likely to die from pregnancy related causes, than white mothers. The Healthy People 2010 Objective is to reduce maternal deaths to 3.3 per 100,000 live births.

**Table 22. Number of Maternal Deaths and Maternal Mortality Ratios per 100,000 Live Births by Race, Nashville, TN, 1990 - 2000**

Year	All Races		White		Black	
	Number	Ratio <sup>1</sup>	Number	Ratio	Number	Ratio
1990	0	0	0	0	0	0
1991	1	11.6	0	0	1	37.2
1992	2	23.7	0	0	2	78.1
1993	1	12	1	18.2	0	0
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	3	36.4	3	54.5	0	0
1997	0	0	0	0	0	0
1998*	1	11.8	0	0	0	0
1999	3	35.4	1	18.2	2	77.5
2000	0	0	0	0	0	0

\*The one death in 1998 was of unknown race

<sup>1</sup>The maternal mortality ratio is per 100,000 live births

Total may include events with race other than white or black

## Data Sources

Metro Public Health  
Department

## Findings

Table 22 shows the number of maternal deaths in Nashville, with the corresponding maternal mortality ratio, for each year since 1990. The number of maternal deaths in Nashville is very low, with a maximum of three deaths occurring in 1996 and 1999. Yet, for those years with a maternal death, the maternal mortality ratio is greater than that of the U.S. and the Healthy People 2010 Objective. It is important to note that the disparity in outcomes between whites and blacks is still evident. For example, in 1999, the maternal mortality ratio for blacks was 77.5 deaths per 100,000 live births, a ratio 4.3 times the rate of 18.2 for whites.

## Discussion

In 2000, there were no pregnancy-associated deaths in Nashville. Maternal mortality has been very low over the past decade with a total of 11 deaths from 1990 - 2000. It is important to note that maternal deaths represent only the most serious of pregnancy complications. It is estimated that there are 300 - 500 maternal deaths in the U.S. each year, and that for every one of those deaths, there are over 3,600 hospital admissions for complications during pregnancy.<sup>1</sup> Early and adequate prenatal care is the best way to detect and treat pregnancy-related complications before the life of the mother and child is put at risk.

### References:

1. Atrash HK, Lawson HW, Ellerbrock TV, Rowley DL, Koonin LM. Pregnancy-related mortality. In: Wilcox, LS, Marks, JS, eds. *From Data to Action: CDC's Public Health Surveillance for Women, Infants, and Children*. U.S. Department of Health and Human Services; 1995.
2. Centers for Disease Control and Prevention. Healthier mothers and babies – 1990-1999. *Morbidity and Mortality Weekly Report*. 1999;48:849-857.

The number of maternal deaths in Nashville is very low, with a maximum of three deaths occurring in 1996 and 1999.

## Related Indicators

- Perinatal and infant mortality
- Maternal mortality

### 3.3 Mortality

#### Background

Mortality rates are one measurement of the health status of a community. This was recognized early in the history of Nashville when registration of causes of death in the city began in 1874.<sup>1</sup> Since mortality information is routinely reported to the health department via death certificates, this data is frequently used as a major indicator to describe the overall health of Nashville. Mortality rates can reflect advances in medical science and public health or their failings. However, mortality rates alone do not give a complete description of the public's health. Mortality rates do not provide information on the number of sick persons in the community, the type or severity of illnesses which do not cause death, or the quality of life that these persons experience.

#### Findings

##### *Number of Deaths*

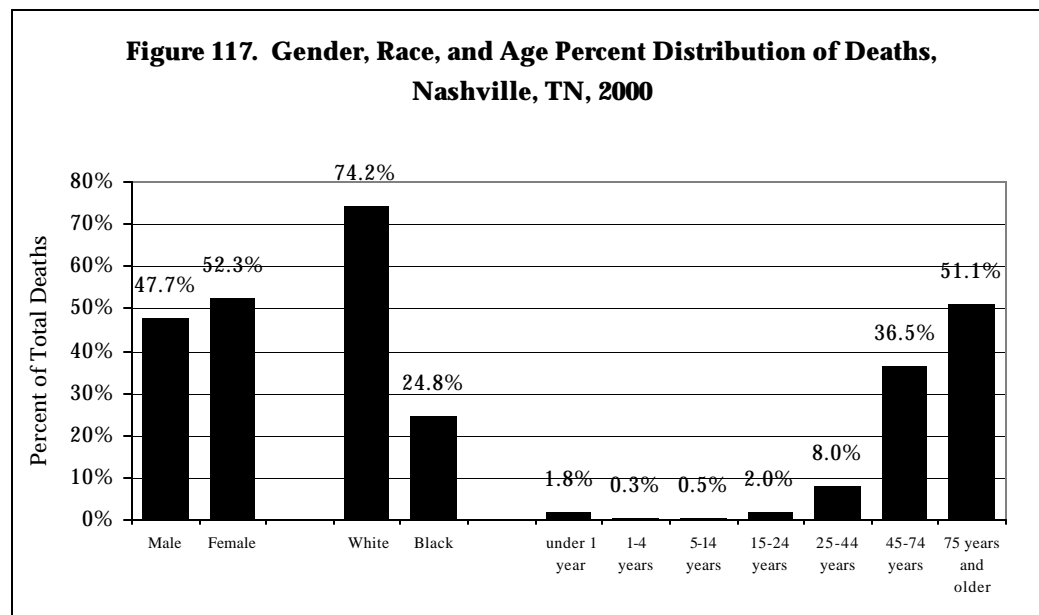
In 2000, there were 5,048 resident deaths in Nashville, an increase of 24 deaths from 1999. The racial breakdown for these deaths was 74.2% white, and 24.8% black (Figure 117), which closely mimics the racial break-down of Nashville's population (see Section 2.1.1.3 for more information on racial distribution of the population). Pertaining to gender, 47.7% of the year 2000 deaths were male and 52.3% were female. Grouping deaths by both race and gender, 39% of total deaths occurred in white females, 35% in white males, 13% in black females, and 12% in black males. Of the people who died in 2000, 51.1% were aged 75 or older; 44.4% were between the ages of 25 – 74; and 4.5% were aged 24 or younger. Among blacks, 63.1% of the deaths were of persons less than 75 years of age, and among whites, 43.9% of the deaths were of persons less than 75 years of age.

## Additional Data

Appendices  
pages D-53 - D-72

## Data Sources

- Metro Public Health Department
- Tennessee Department of Health



**Crude Death Rate**

The crude death rate (CDR) decreased from 947.8 deaths per 100,000 population in 1999 to 885.8 in 2000 (Table 23). This drop of over 60 deaths per 100,000 is not from a decrease in deaths. The decrease in CDR was due to the use of different population numbers for calculations. In 1999, the CDR was calculated using an estimate of Nashville's population for that year. When the 2000 Census count was released, it revealed that Nashville's population was actually much larger than had been estimated in the last 10 years since the 1990 Census. With a much larger denominator for the rate, the CDR decreased in 2000.

**Table 23. Number of Deaths and Crude Death Rates, Nashville, TN, 2000**

	Deaths	Percent	Crude Death Rate (per 100,000 population)
Total Population	5,048		885.8
<i>Gender Groups</i>			
Male	2,406	47.7%	872.2
Female	2,642	52.3%	898.6
<i>Race Groups</i>			
White	3,747	74.2%	981.4
Black	1,254	24.8%	849.0
<i>Race-Gender Groups</i>			
Black Female	633	0.1%	800.9
Black Male	621	12.0%	904.5
White Female	1,989	39.0%	1,009.7
White Male	1,758	35.0%	951.4
<i>Age Groups</i>			
under 1 year	90	1.8%	1,110.8
1-4 years	14	0.3%	47.1
5-14 years	25	0.5%	36.3
15-24 years	99	2.0%	115.3
25-44 years	402	8.0%	207.6
45-74 years	1,840	36.5%	1,198.6
75 years and older	2,578	51.1%	8,580.2

In 2000, there were 5,048 resident deaths in Nashville with a crude death rate of 885.8 per 100,000 population.

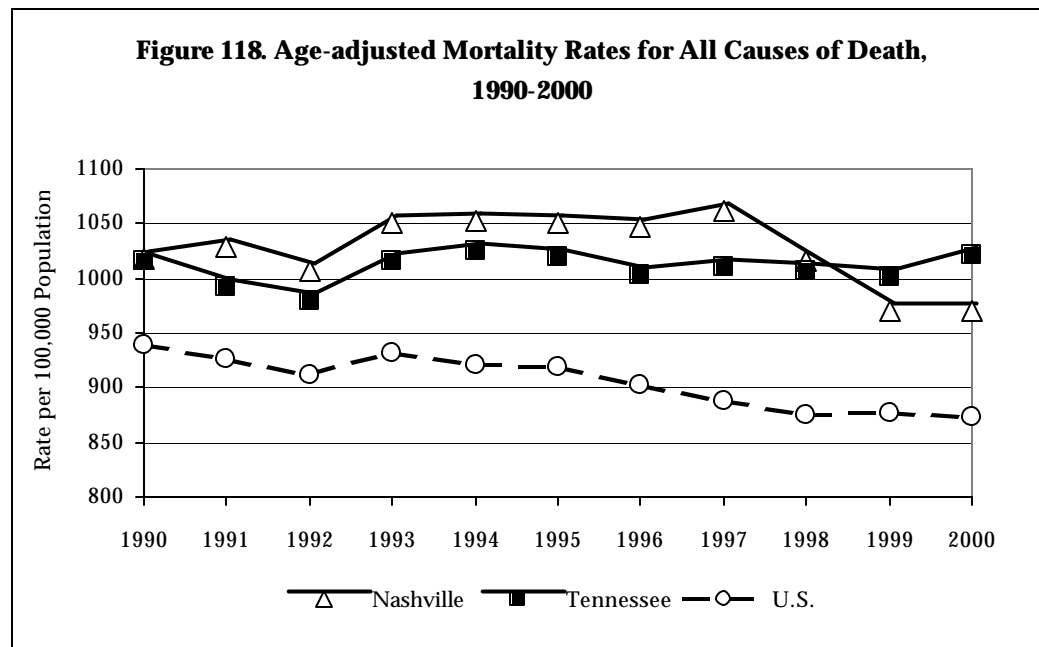
The CDR should not be used to measure or compare differences in death rates between gender and race groups. The following section on age-adjusted rates addresses that issue. However, age-specific CDRs do offer valuable information to evaluate the burden of death in specific age-groups. The CDR for persons under 1 year of age was 1110.8 per 100,000 population in 2000. With more than 50% of the deaths in 2000 occurring in Nashville residents over the age of 75, it is not surprising that the CDR for this age group is nearly 8 times higher than that of any other age group – 8,580.2 per 100,000 population.

**Age-adjusted Mortality Rate and Trends**

Age-adjusted mortality rates (AMR) are derived from the CDR. Age-adjustment standardizes the death rates to the U.S. 2000 standard population and, subsequently,

removes the differences in age distribution between population subgroups or between different populations. The proper way to compare death rates between blacks, whites, males and females, is to compare their AMRs.

The overall AMR for Nashville in 2000 was 970.1 per 100,000 population. Nashville's rate was lower than the Tennessee overall age-adjusted death rate (1,021.2) but higher than the U.S. rate (872.4) (Figure 118). Nashville's AMR has fluctuated over the last 11 years. In that time the rate had an overall reduction of approximately 5% by 2000. Over the last 11 years, Nashville's AMR has consistently been higher than that of the U.S. From 1990 to 1998, Nashville's AMR was also higher than Tennessee's, but in 1999 the Nashville rate fell below the Tennessee rate and remained there for 2000.



Overall mortality for Nashville has decreased over the last 11 years.

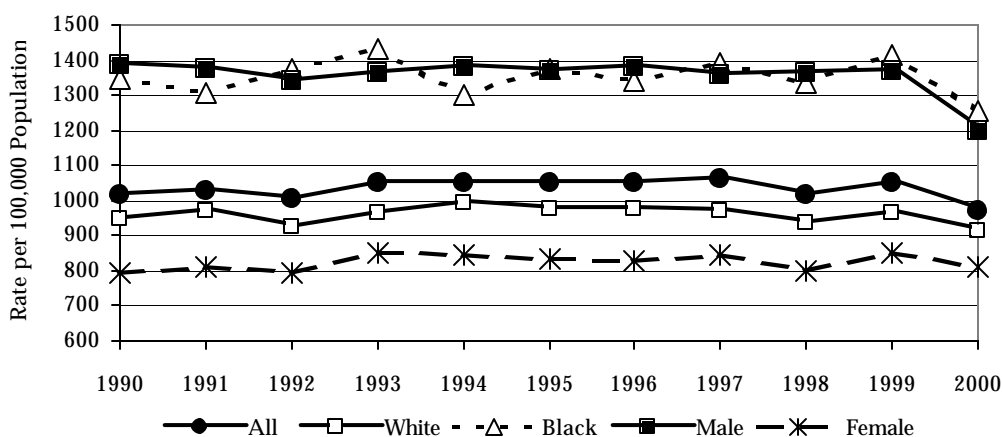
Figure 119 shows that males and blacks have higher death rates (AMRs) than the general Nashville population. This graph also shows that while there were more deaths in women than men, women actually have a lower death rate after removing the differences in the age distribution between the male and female population. The same is true for black and white subgroups. While more whites died in 2000, whites actually have a lower death rate than blacks. As noted earlier, a greater proportion of deaths in blacks occurred in persons under age 75. Deaths at younger ages count more in the AMR, and so, the black death rate is higher than the white. AMRs for females and whites did not change much in the last 11 years. The rate for men was steady for 10 years, but dropped by 12.5% from 1999 to 2000 to a rate of 1196.0 per 100,000 population. The black AMR had no clear trend over the last 11 years, it alternated between increases and decreases. The AMRs for race-gender groups reveal that black males have the highest death rate in Nashville and white females have the lowest (Figure 120).

### Discussion

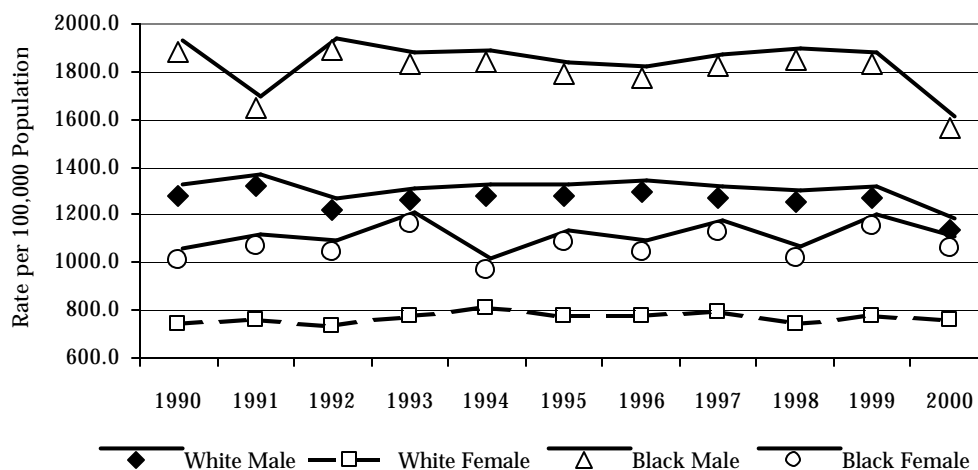
Overall mortality for Nashville has decreased over the last 11 years. If the population is split into race and gender groups, we still see a slight decrease in mortality.



**Figure 119. Age-adjusted Mortality Rates by Gender and Race, Nashville, TN, 1990-2000**



**Figure 120. Age-adjusted Mortality Rates for Race-Gender Groups, Nashville, TN, 1990-2000**



However, despite the decrease, blacks, males, and especially black males have led Nashville in deaths per population over the last 11 years. Regarding deaths in blacks, many of MPHD's health promotion and chronic disease management programs target health problems that put blacks at higher risk for death – examples are REACH 2010 and the Chronic Disease Intervention Program. Still more should be done to target the health problems that contribute specifically to death in men (both white and black).

Reference:

1. Horner N. Celebrating 150 years of public health in Nashville (1850 - 2000). *Public Health Watch*. Special Edition/April 2000. Vol4/No.2. Nashville, Tennessee: Metropolitan Public Health Department; 2000.

## Related Indicators

- Physical activity
- Overweight and obesity
- Tobacco use--smoking
- Environmental tobacco smoke
- Sexual behavior
- Safety belt use
- Bicycle helmet use
- Cancer screening

## 3.3.1 Leading Causes of Death

## Background

Considering deaths by their cause we can learn more specifically what diseases and disorders are prominent in our community. Causes of death are ranked by number of deaths occurring during the year under study to determine the “leading” causes of death. Table 25 contains the top five causes of death in Nashville, dating back to the year 1891. During the early history of Nashville, consumption, now known as tuberculosis, was the leading cause of death. Despite the many advances in medicine and health care access that have occurred over the course of Nashville’s history, the leading causes of death for Nashvillians in 2000—heart disease, cancer, and stroke—have been the leading causes of death since 1934 (for the years presented in Table 25). Heart disease has been among the top five causes of death since 1891.

## Findings

Seventy-eight percent of the deaths in Nashville in 2000 were attributable to the 10 conditions listed in Table 24. Heart disease and cancer were responsible for more than half of the deaths. Two changes occurred in the rankings from 1999 to 2000. Deaths due to accidents surpassed deaths from chronic lower respiratory diseases, placing accidents as the fourth leading cause of death in Nashville. Homicide deaths outnumbered suicide deaths in 2000, putting homicide as the 8<sup>th</sup> leading cause of death.

## Additional Data

Appendices  
pages D-56 - D-63

**Table 24. Ten Leading Causes of Death, Number of Deaths, Percent of All Deaths and Age-adjusted Mortality Rates, Nashville, TN, 2000**

Rank	Cause	Deaths	Percent	Age-adjusted Mortality Rate†
1	Heart Disease	1,412	28.0%	275.78
2	Cancer	1,123	22.2%	219.02
3	Stroke	406	8.0%	79.83
4	Accidents	261	5.2%	45.81
5	Chronic Lower Respiratory Disease*	220	4.4%	43.38
6	Diabetes Mellitus	161	3.2%	31.19
7	Influenza and Pneumonia	120	2.4%	23.34
8	Alzheimer's Disease	90	1.8%	17.69
8	Homicide	90	1.8%	14.30
9	Suicide	75	1.5%	12.92

\* Chronic Lower Respiratory Disease was called Chronic Obstructive Pulmonary Disease previously.

† Age-Adjusted Mortality Rates were calculated using the U.S. 2000 Standard Population. Rates are per 100,000 population.

NOTE: Data from Tennessee Department of Health. Analysis done by Metro Public Health Department.

## Data Sources

- Metro Public Health Department
- Tennessee Department of Health

Table 25. Five Leading Causes of Death in Nashville for Selected Years, 1891 - 2000

Year	Cause of Death Rank				
	1	2	3	4	5
1891	Consumption <sup>1</sup>	Pneumonia	Old age	Heart disease	
1892	Consumption	Pneumonia	Heart disease	Infantile Convulsions	Deaths from violence
1895	Consumption	Pneumonia	Old age	Heart disease	Deaths from violence
1897	Consumption	Pneumonia	Heart disease	Convulsions	Old age
1898	Consumption	Pneumonia	Heart disease	Deaths from violence	Senility
1903	Consumption	Pneumonia	Heart disease	Diarrheal illness to children under 5 years of age	Deaths from violence
1904	Consumption	Heart disease	Pneumonia	Diarrheal illness to children under 2 years of age	Deaths from violence
1905	Consumption	Heart disease	Pneumonia	Diarrheal illness to children under 2 years of age	Deaths from violence
1906	Consumption	Heart disease	Pneumonia	Diarrheal illness to children under 2 years of age	Deaths from violence
1907	Consumption	Heart disease	Pneumonia	Diarrheal illness to children under 2 years of age	Nephritis
1908	Consumption	Heart disease	Pneumonia	Diarrheal illness to children under 2 years of age	Nephritis
1909	Consumption	Heart disease	Pneumonia	Diarrheal illness to children under 2 years of age	Nephritis
1934	Heart disease	Tuberculosis	Pneumonia	Cerebral hemorrhage	Cancer
1935	Heart disease	Cerebral hemorrhage	Nephritis	Cancer	Tuberculosis
1937	Heart disease	Cerebral hemorrhage	Nephritis	Cancer	Tuberculosis
1938	Heart disease	Cerebral hemorrhage	Cancer	Congenital malformations	Nephritis
1939	Heart disease	Cerebral hemorrhage	Cancer	Congenital malformations	Tuberculosis
1940	Heart disease	Cerebral hemorrhage	Nephritis	Accidental deaths	Congenital malformations
1941	Heart disease	Cancer	Cerebral hemorrhage	Nephritis	Tuberculosis
1949	Heart disease	Apoplexy <sup>2</sup>	Cancer	Accidental deaths	Congenital defects and infancy
1950	Heart disease	Cancer	Apoplexy	Accidental deaths	Pneumonia
1951	Heart disease	Vascular lesions affecting the central nervous system	Malignant neoplasms	Diseases of early infancy	Senility
1952	Heart disease	Cancer	Accidental deaths		
1953	Heart disease	Cancer	Cerebral hemorrhage	Senility	Diseases of early infancy
1954	Heart disease	Cancer	Cerebral hemorrhage	Senility	Diseases of early infancy
1955	Heart disease	Cancer	Cerebral hemorrhage	Ill defined or unknown	Diseases of early infancy
1957	Heart disease	Cerebral hemorrhage	Cancer	Ill defined or unknown	Diseases of early infancy
1958	Heart disease	Cerebral hemorrhage	Cancer	Diseases of early infancy	Pneumonia
1960	Heart disease	Cerebral hemorrhage	Cancer	Diseases of early infancy	Pneumonia
1985	Heart disease	Malignant neoplasms	Cerebrovascular disease	Accidents/Motor vehicle accidents	Chronic obstructive pulmonary disease
1995	Heart disease	Cancer	Stroke	Accidents	Chronic obstructive pulmonary disease
1998	Heart disease	Cancer	Stroke	Pneumonia and influenza	Chronic obstructive pulmonary disease
2000	Heart disease	Cancer	Stroke	Accidents	Chronic Lower Respiratory Diseases <sup>3</sup>

<sup>1</sup> Obsolete term for a wasting of the tissues of the body, usually tuberculosis (Stedman's Medical Dictionary, 26th Edition)<sup>2</sup> Obsolete term for a cerebral stroke, most often due to intracerebral hemorrhage (Stedman's Medical Dictionary, 26th Edition)<sup>3</sup> Chronic Lower Respiratory Diseases were previously classified as Chronic Obstructive Pulmonary Diseases.

Eight of Nashville's leading causes of death also ranked in the top 10 for the U.S. (2000 preliminary data) (Table 26). In Nashville, homicide and suicide ranked as the 8<sup>th</sup> and 9<sup>th</sup> leading causes of death in 2000, but in the U.S. they ranked 15<sup>th</sup> and 11<sup>th</sup>, respectively. Accidents also ranked higher in Nashville than in the U.S. – 4<sup>th</sup> in Nashville, 5<sup>th</sup> in the U.S. All other leading causes of death had the same rankings in Nashville and the U.S. Tennessee data for leading causes of death is not yet available for 2000.

**Table 26. Leading Causes of Death in the U.S., Preliminary 2000 Data**

Rank	Cause of Death
1	Diseases of the heart
2	Malignant neoplasms (cancer)
3	Cerebrovascular diseases (stroke)
4	Chronic lower respiratory diseases
5	Accidents
6	Diabetes Mellitus
7	Influenza and pneumonia
8	Alzheimer's disease
9	Nephritis, nephrotic syndrome, and nephrosis
10	Septicemia

Source: National Vital Statistics Report, Vol. 49, No. 12, October 9, 2001.

Table 27 shows the leading causes of male and female deaths. Grouping by gender does not change the ranking for the top two causes of death – heart disease and cancer – but the rest of the list was affected. Males were more likely than females to die of accidents,

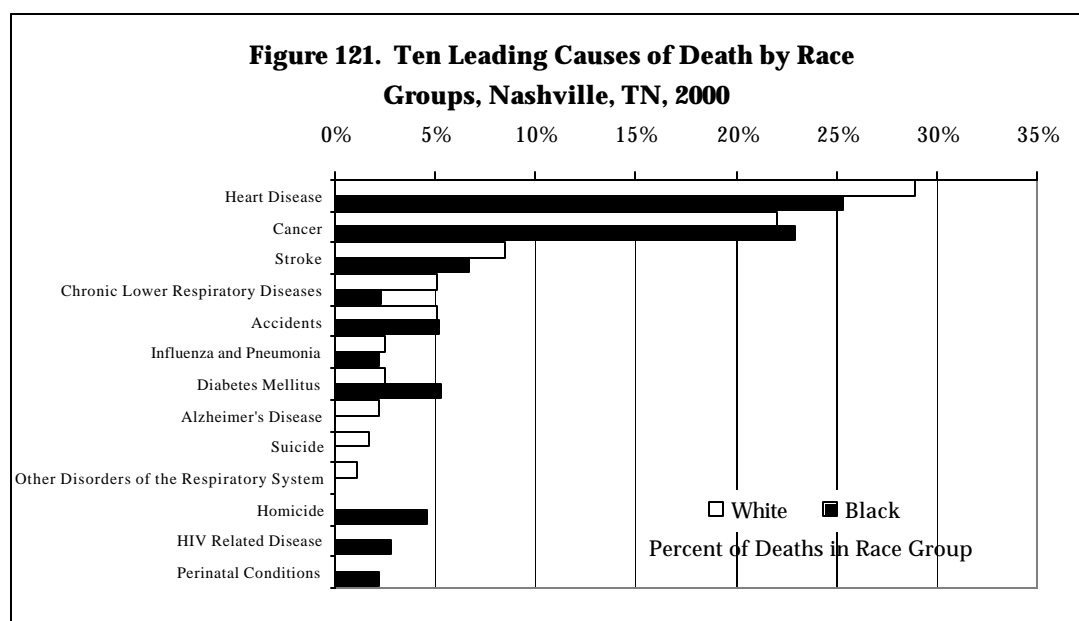
**Table 27. Leading Causes of Death by Gender, Nashville, TN, 2000**

Rank	Male	Female
1	Heart Disease	Heart Disease
2	Cancer	Cancer
3	Accidents	Stroke
4	Stroke	Chronic Lower Respiratory Diseases
5	Chronic Lower Respiratory Diseases	Accidents
6	Homicide	Diabetes Mellitus
7	Suicide	Influenza and Pneumonia
8	Diabetes Mellitus	Alzheimer's Disease
9	Influenza and Pneumonia	Other Diseases of the Respiratory System
10	HIV Related Disease	Nephritis, Nephrotic Syndrome, and Nephrosia Septicemia

NOTE: Data from Tennessee Department of Health. Analysis done by Metro Public Health Department.

homicide, suicide, and HIV related disease. Females were more likely to die of stroke, diabetes, influenza and pneumonia, and Alzheimer's disease.

The leading causes of death were not the same for white and black populations in Nashville. The top three causes of death were the same – heart disease, cancer, and stroke – and accidents ranked as the fifth leading cause for blacks and the fourth for whites (Figure 121 and Table 28). Whites and blacks also had chronic lower respiratory disease, influenza and pneumonia, and diabetes in common, however, the rankings for these causes differed by race. Deaths due to diabetes were more common in blacks, but deaths from chronic lower respiratory disease and influenza and pneumonia were more common in whites. Additionally, each race group has three unique leading causes of death. For whites, Alzheimer's disease, suicide, and other disorders of the respiratory system ranked as the 8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> leading causes of death, respectively. For blacks, homicide, HIV related disease, and perinatal conditions ranked as the 6<sup>th</sup>, 7<sup>th</sup>, and 9<sup>th</sup> leading causes of death, respectively.



**Table 28. Leading Causes of Death by Race, Nashville, TN, 2000**

Rank	White	Black
1	Heart Disease	Heart Disease
2	Cancer	Cancer
3	Stroke	Stroke
4	Accidents	Diabetes Mellitus
5	Chronic Lower Respiratory Diseases	Accidents
6	Influenza and Pneumonia	Homicide
7	Diabetes Mellitus	HIV Related Disease
8	Alzheimer's Disease	Chronic Lower Respiratory Diseases
9	Suicide	Perinatal Conditions
10	Other Diseases of the Respiratory System	Influenza and Pneumonia

NOTE: Data from Tennessee Department of Health. Analysis done by Metro Public Health Department.

Table 29 contains the leading causes of death grouped by both race and gender. It reveals that there were some unique leading causes of death in each race-gender group. Deaths due to perinatal conditions occurred predominately in black males. Leading causes of death that were unique to the black females included hypertension and septicemia. Other diseases of the respiratory system and circulatory system were unique to the leading causes of death for white females, and chronic liver disease and cirrhosis were unique to white males. This grouping also shows that many causes of death did not rank the same in each of the race-gender groups. For instance, cancer and not heart disease was the leading cause of death in black males.

**Table 29. Leading Causes of Death by Race-Gender Groups, Nashville, TN, 2000**

Rank	White Male	Black Male	White Female	Black Female
1	Heart Disease	Cancer	Heart Disease	Heart Disease
2	Cancer	Heart Disease	Cancer	Cancer
3	Accidents	Homicide	Stroke	Stroke
4	Stroke	Accidents	Chronic Lower Respiratory Diseases	Diabetes Mellitus
5	Chronic Lower Respiratory Diseases	Stroke	Accidents	Accidents
6	Suicide	Diabetes Mellitus	Diabetes Mellitus	Hypertension Influenza and Pneumonia
7	Influenza and Pneumonia	HIV Related Diseases	Influenza and Pneumonia	Unclassified Clinical and Laboratory Findings
8	Alzheimer's Disease	Perinatal Conditions	Alzheimer's Disease	Homicide
9	Diabetes Mellitus	Chronic Lower Respiratory Diseases	Other Diseases of the Respiratory System	Chronic Lower Respiratory Diseases Septicemia
10	Chronic Liver Disease and Cirrhosis	Suicide	Other Diseases of the Circulatory System	Nephritis, Nephrotic Syndrome, and Nephrosia

NOTE: Data from Tennessee Department of Health. Analysis done by Metro Public Health Department.

Many causes of death are associated with specific age groups. When the year 2000 deaths were categorized by age groups (Table 30), accidents emerged as the leading cause of death for residents between ages 1 and 44. Because the numbers of deaths were very small in some age groups, data should be interpreted cautiously.

Please see the Appendix for leading cause of death information by planning and council districts.

**Table 30. Leading Causes of Death by Age Group, Nashville, TN, 2000**

Rank	< 1 Year (deaths)	1-4 Years (deaths)	5-14 Years (deaths)	15-24 Years (deaths)	25-44 Years (deaths)	45-64 Years (deaths)	65+ Years (deaths)
1	Perinatal Conditions (39)	Accidents (5)	Accidents (12)	Accidents (40)	Accidents (93)	Cancer (311)	Heart Disease (1111)
2	Congenital Anomalies (14)	Cancer (3)	Congenital Anomalies Heart Disease (2) Cancer (2)	Homicide (29)	Heart Disease (46) Homicide (46)	Heart Disease (246)	Cancer (765)
3	Unclassified Clinical and Laboratory Findings (12)			Suicide (11)	HIV Related Disease (41)	Accidents (42)	Stroke (360)
4	Accidents (4) Heart Disease (4) Other Diseases of the Respiratory System (4)			Heart Disease (3)	Cancer (40)	Stroke (40) Diabetes Mellitus (40)	Chronic Lower Respiratory Diseases (181)
5	Septicemia (3)			Other Diseases of the Respiratory System (2)  Unclassified Clinical and Laboratory	Suicide (31)	Chronic Lower Respiratory Diseases (34)	Diabetes Mellitus (111)
6	Influenza & Pneumonia (2)				Diabetes Mellitus (9)	Chronic Liver Disease and Cirrhosis (26)	Influenza & Pneumonia (106)
7					Chronic Liver Disease and Cirrhosis (8)	Suicide (22)	Alzheimer's Disease (87)
8					Unclassified Clinical and Laboratory Findings (7)	HIV Related Disease (19)	Accidents (64)
9					Stroke (5) Influenza & Pneumonia (5)	Nephrotic Syndrome and Nephrosia (14)	Other Diseases of the Circulatory System (37)
10						Homicide (10)	Nephritis, Nephrotic Syndrome, and Nephrosia (36)

NOTE: Data from Tennessee Department of Health. Analysis done by Metro Public Health Department.

**Discussion**

Heart disease, cancer, and stroke have been the top three causes of death in Nashville for many years. MPHD has numerous health promotion and disease prevention programs targeted at reducing the burden of these diseases in our community, and subsequently the number of deaths. For heart disease, community coalitions facilitated by the MPHD like the Tobacco Control Initiative and Walk Nashville target behaviors to reduce risk for disease. The Chronic Disease Intervention Program is an example of MPHD's work to fight the consequences of diseases like diabetes. The high number of deaths from accidents and homicide points to the need for us to address violence as a public health issue. MPHD has begun to do this with its Unintentional Injury Prevention program and Violence Prevention Initiative.

Heart disease, cancer, and stroke have been the top three causes of death in Nashville for many years.



## Related Indicators

- Physical activity
- Overweight and obesity
- Tobacco use--smoking
- Environmental tobacco smoke
- Sexual behavior
- Safety belt use
- Bicycle helmet use
- Cancer screening

## Additional Data

Appendices  
pages D-64 - D-72

## Data Sources

- Metro Public Health Department
- Tennessee Department of Health

### 3.3.2 Years of Potential Life Lost

#### Background

The death of a person at a young age might be interpreted as that person's life being cut short. Years of potential life lost (YPLL) is a measure of premature death for persons under 75 years of age.<sup>1,2</sup> Deaths prior to age 75 are considered premature because life expectancy in the U.S. is approximately 75 years. The most current estimate of life expectancy in the U.S. is 76.7 years for persons born in 1998.<sup>3</sup> The YPLL value for each decedent under age 75 is simply the difference between their age at death and the target of 75 years (YPLL=75-age at death). YPLL can be calculated for all deaths or for specific causes of death.

Ranking causes of death by their cumulative YPLL creates a list somewhat different from the leading causes of death in section 3.3.1 of this report. Deaths from cancer resulted in the largest number of YPLL for any cause of death (Table 32). As would be expected, causes of death more prevalent in younger age groups ranked high for YPLL. For example, accidents, homicide, and perinatal conditions were all in the top 10 causes of YPLL. Perinatal conditions caused more YPLL in blacks than whites. Chronic lower respiratory disease was a unique leading cause of YPLL in whites, while congenital anomalies and diabetes mellitus were unique in blacks.

#### Findings

Nashville's YPLL rates per population were higher in general than those of the U.S. (Table 31). The Nashville rates ranged from only slightly higher to more than double the U.S. rates. Nashville's rate for YPLL from cancer was only 4% higher than the U.S.

**Table 31. Leading Causes of Years of Potential Life Lost, Age-adjusted Rate per 100,000 Population\*, Nashville, TN 2000 and U.S. 1998**

Cause	Age-adjusted YPLL per 100,000 population	
	Nashville, TN 2000	U.S. 1998
Cancer	1,816.2	1,746.90
Heart Disease	1,540.1	1,365.30
Accidents	1,427.9	1,047.10
Homicide	614.6	298.2
Perinatal Conditions	518.2	NA <sup>1</sup>
Suicide	380.6	363.3
HIV Related Diseases	357.9	175.4
Congenital Abnormalities	254.2	NA
Diabetes Mellitus	254.7	176.8
Unclassified Clinical and Laboratory Findings	238.6	NA

\* Adjusted to the U.S. 2000 standard population

<sup>1</sup> NA indicated the rate was not available.

**Table 32. Leading Causes of Death Ranked by Years of Potential Life Lost, by Race, Nashville, TN, 2000**

All			White			Black		
Rank	Cause	YPLL	Rank	Cause	YPLL	Rank	Cause	YPLL
	All Causes	54,163.00		All Causes	31,857.00		All Causes	21,407.50
1	Cancer	9,771.00	1	Cancer	6,613.00	1	Cancer	3,044.00
2	Heart Disease	8,504.50	2	Accidents	5,843.50	2	Heart Disease	2,847.00
3	Accidents	8,445.00	3	Heart Disease	5,505.00	3	Homicide	2,589.00
4	Homicide	3,930.50	4	Suicide	1,812.50	4	Accidents	2,503.50
5	Perinatal Conditions	3,028.50	5	Homicide	1,270.50	5	Perinatal Conditions	2,086.00
6	Suicide	2,344.00	6	HIV Related Diseases	958.50	6	HIV Related Disease	1,224.50
7	HIV Related Diseases	2,183.00	7	Unclassified Clinical and Laboratory Findings	956.50	7	Congenital Abnormalities	733.00
9	Congenital Abnormalities	1,458.50	8	Chronic Lower Respiratory Diseases	884.50	8	Diabetes Mellitus	641.00
8	Unclassified Clinical and Laboratory Findings	1,422.00	9	Perinatal Conditions	793.50	9	Stroke	550.50
10	Diabetes Mellitus	1,404.00	10	Stroke	756.50	10	Suicide	470.50

Data Source: Tennessee Department of Health, October 8, 2001, April 17, 2002.

rate and our suicide rate was only 5% higher than the U.S. The YPLL rate from diabetes was 44% higher in Nashville than the U.S. The largest differences in rates were for HIV-related disease and homicide. The Nashville YPLL rates for these causes of death were double the rates in the U.S.

When considering YPLL by gender, we find that accidents and heart disease caused the greatest YPLL in males (Table 33). Cancer caused the greatest YPLL in females. Suicide was a leading cause of YPLL in males, but did not rank in the top 10 for females. Congenital anomalies and chronic lower respiratory diseases were leading causes of YPLL in females but not males.

**Table 33. Leading Causes of Death Ranked by Years of Potential Life Lost, by Gender, Nashville, TN, 2000**

Male			Female		
Rank	Cause	YPLL	Rank	Cause	YPLL
	All Causes	34,172		All Causes	19,991
1	Accidents	5,713.50	1	Cancer	4,560.50
2	Heart Disease	5,435	2	Heart Disease	3,010
3	Cancer	5,210.50	3	Accidents	2,791
4	Homicide	3,080.50	4	Perinatal Conditions	894
5	Perinatal Conditions	2,134.50	5	Congenital Anomalies	893.5
6	Suicide	2,043.50	6	Homicide	850
7	HIV Related Disease	1,634	7	Diabetes Mellitus	648.5
8	Unclassified Clinical and Laboratory Findings	917.5	8	Stroke	625
9	Diabetes Mellitus	755.5	9	HIV Related Disease	549
10	Stroke	697.5	10	Chronic Lower Respiratory Disease	512

Data Source: Tennessee Department of Health, October 8, 2001, April 17, 2002.

Grouping leading causes of YPLL for 2000 deaths by race and gender categories, we see that the top rankings in each group include cancer, heart disease, and accidents (Table 34). While these three causes claimed a great proportion of YPLL in black males, homicide topped the list, accounting for 15% of the total YPLL. Chronic liver disease and cirrhosis were a leading cause of YPLL in white males, but not in any other group. Similarly, chronic lower respiratory diseases were a unique leading cause of YPLL in white females, and septicemia was unique to black females.

YPLL calculations by planning district and council district are in the Appendix.

**Table 34. Leading Causes of Death Ranked by Years of Potential Life Lost, by Race and Gender, Nashville, TN, 2000**

Rank	White Male		White Female		Black Male		Black Female	
	Cause	YPLL	Cause	YPLL	Cause	YPLL	Cause	YPLL
	All Causes	20,381.50	All Causes	11,475.50	All Causes	13,185.00	All Causes	8,222.50
<b>1</b>	Accidents	3,896.00	Cancer	3,156.50	Homicide	2,037.50	Cancer	1,352.00
<b>2</b>	Heart Disease	3,754.00	Accidents	1,947.50	Cancer	1,692.00	Heart Disease	1,212.50
<b>3</b>	Cancer	3,456.50	Heart Disease	1,751.00	Accidents	1,660.00	Accidents	843.50
<b>4</b>	Suicide	1,567.50	Congenital Anomalies	485.50	Heart Disease	1,634.50	Perinatal Conditions	596.00
<b>5</b>	Homicide	1,017.50	Chronic Lower Respiratory Disease	470.00	Perinatal Conditions	1,490.00	Homicide	551.50
<b>6</b>	HIV Related Disease	755.50	Unclassified Clinical and Laboratory Findings	443.50	HIV Related Disease	878.50	Congenital Anomalies	408.00
<b>7</b>	Perinatal Conditions	644.50	Stroke	335.00	Suicide	415.00	HIV Related Disease	346.00
<b>8</b>	Unclassified Clinical and Laboratory Findings	513.00	Diabetes Mellitus	332.00	Unclassified Clinical and Laboratory Findings	359.00	Diabetes Mellitus	316.50
<b>9</b>	Chronic Liver Disease and Cirrhosis	452.00	Homicide	253.00	Congenital Anomalies	325.00	Septicemia	310.00
<b>10</b>	Stroke	421.50	Suicide	245.00	Diabetes Mellitus	324.50	Stroke	290.00

Data Source: Tennessee Department of Health, October 8, 2001, April 17, 2002.

### Discussion

While general mortality statistics tell us what health problems contribute most to deaths in Nashville, they are dominated by deaths of the elderly and give little attention to deaths of younger persons. YPLL is useful in assessing the impact of deaths in younger persons, or premature mortality. Cancer, heart disease, accidents, and homicide contribute the most to Nashvillians' premature mortality. Cancer and heart disease contribute a great amount because of the large *number* of deaths attributable to these causes, while accidents and homicide are responsible for a large number of lost years because the majority of Nashvillians who lose their life in accidents or from homicide are relatively young (between the ages of 1 and 44). YPLL also emphasizes the need for reducing deaths from accidents in males. Years lost due to accidental deaths surpass years lost due to heart disease in this subgroup of the population.

### References:

1. Centers for Disease Control and Prevention. Premature mortality in the United States: public health issues in the use of years of potential life lost. *Morbidity and Mortality Weekly Report*. 1986;35(2S):1-11.
2. National Center for Health Statistics. *Health, United States 1996-1997 and Injury Chartbook*. Hyattsville, MD: Centers for Disease Control and Prevention; 1997.
3. Anderson, RN. United States life tables, 1998. *National Vital Statistics Reports*. Vol. 48 no. 18. Hyattsville, Maryland: National Center for Health Statistics; 2001.

YPLL is useful in assessing the impact of deaths in younger persons, or premature mortality. Cancer, heart disease, accidents, and homicide contribute the most to Nashvillians' premature mortality.

## Related Indicators

- Food protection in restaurants and retail food stores
- Drinking water

## 3.4 Morbidity Associated with Notifiable Diseases or Conditions

### Background

A notifiable disease/condition is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease. The Centers for Disease Control and Prevention (CDC) in collaboration with the Council of State and Territorial Epidemiologists determine which diseases are notifiable at the national level. The list is revised periodically to include emerging diseases and to eliminate diseases whose incidence is declining.<sup>1</sup> In Tennessee, the Tennessee Department of Health is given responsibility for the formulation of regulations for the control of communicable diseases under provisions of the Tennessee Code Annotated, Sections 49-6, 68-5, 68-8, 68-9, and 68-10. *Regulations Governing Communicable Diseases in Tennessee* provides the guidelines for notifiable disease/condition reporting in the state.<sup>2</sup> Currently, 56 diseases and conditions are reportable to the local health department by all hospitals, physicians, laboratories, and other persons knowing of or suspecting a case.

Surveillance for notifiable diseases has always been a priority for assessing the health of a community. Timely intervention by public health and other health care providers prevents secondary spread of diseases. Epidemiological information pertaining to notifiable diseases assists those in policy-making positions to determine public health priorities and to plan, implement, and evaluate the effectiveness of programs.

Although antibiotics, vaccines, and public health efforts significantly impacted the prevalence of diseases such as polio, measles, and tuberculosis, they were never completely eradicated. New diseases such as hantavirus, Ebola virus, and “mad cow disease” (a new variant of Creutzfeldt-Jakob disease) continue to emerge. Established conditions have re-emerged or modified to become new threats, i.e., AIDS became a global public health concern, and many cases of tuberculosis are now resistant to the antibiotics that had previously treated the disease effectively. In addition, some microbes, such as staphylococcus bacteria, have begun to exhibit reduced susceptibility to Vancomycin, the antibiotic of last resort.

Adding to the importance of notifiable disease/condition surveillance, new research has revealed that the pathogens that cause infectious disease might also contribute to chronic diseases. Infection with *Helicobacter pylori* is now associated with stomach ulcers. Chronic infection with the hepatitis B and C viruses can lead to liver cancer.<sup>3</sup> Lyme disease, a tick-borne disease, can cause arthritis and other neurologic disease.<sup>3</sup> Other research is investigating a link between heart disease and the bacterium *Chlamydia pneumoniae*.<sup>3</sup>

Today an increasing urgency surrounds notifiable disease surveillance since infectious agents have been used as threats by terrorists. The suffering, death, and economic costs of infectious disease are now magnified by the idea that some of these agents, so hard fought to eliminate as a threat to mankind, may now intentionally be used by mankind upon itself.

Although notifiable disease/condition data is useful for analyzing trends and determining relative disease burdens, the data may be limited by the fact that not all cases of disease are reported to health officials. The degree of completeness of data

## Data Sources

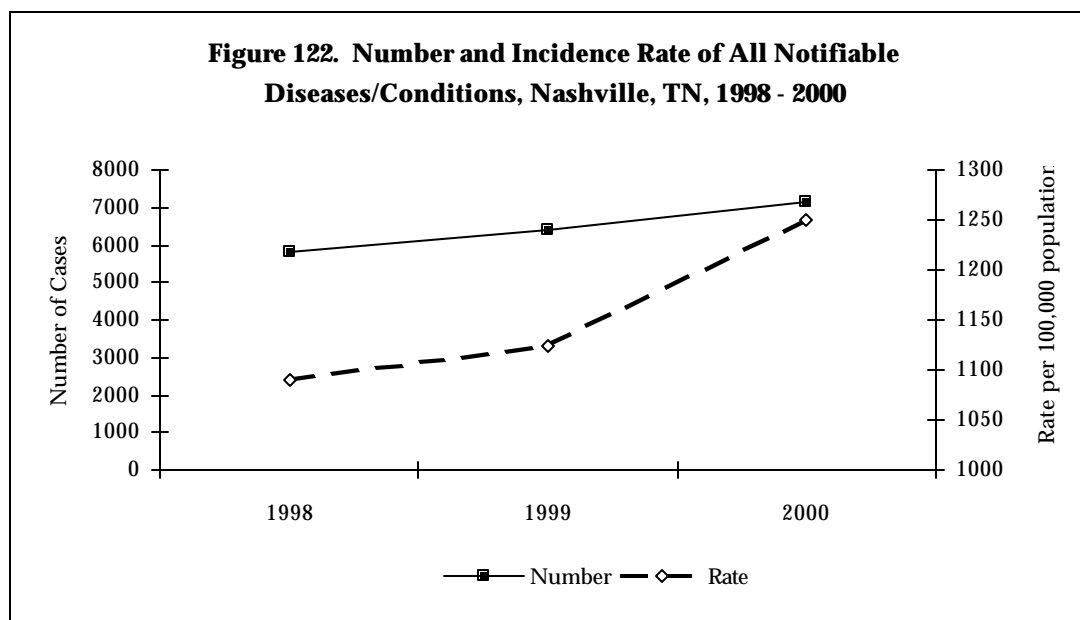
- Metro Public Health Department
- Tennessee Department of Health

reporting may be influenced by the severity of the illness with diseases causing severe physical illness and diagnosed by a clinician being most likely to be reported. Persons with a notifiable disease/condition who experience mild symptoms may not seek medical care. Other factors influencing the completeness of data reporting include: diagnostic facilities available; control measures in effect; public awareness of a specific disease; resources/priorities of the local health officials responsible for disease control; changes in the case definitions for public health surveillance; introduction of new diagnostic tests; and discovery of new disease entities.<sup>1</sup>

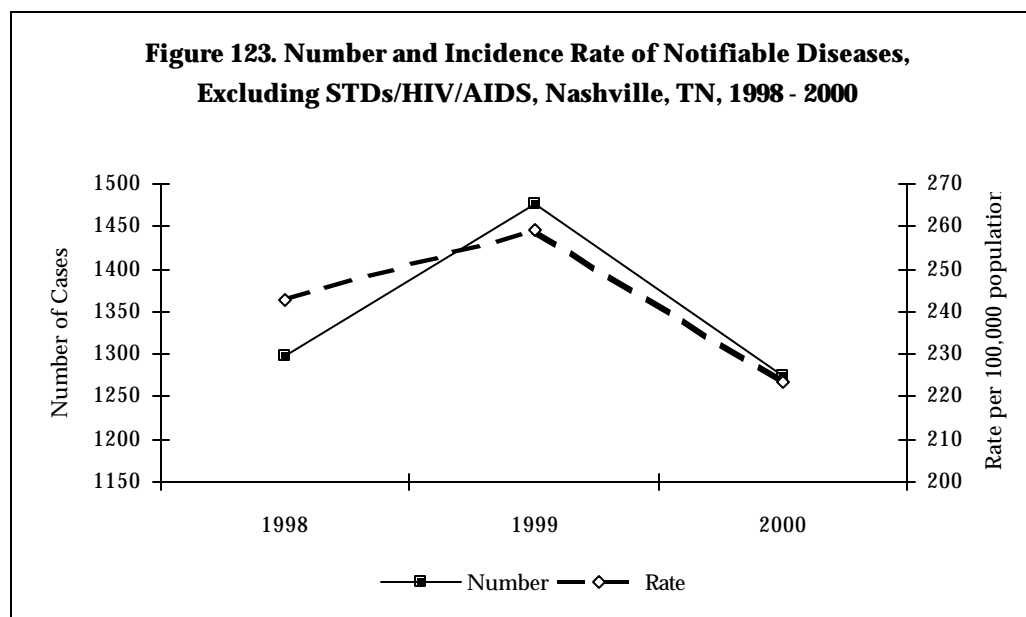
## Findings

### *Trend of Reported Notifiable Diseases/Conditions*

From 1998 to 2000, the incidence rate per 100,000 population for reported cases of all notifiable diseases/conditions in Nashville increased from 1,090.1 in 1998 to 1,250.8 in 2000 (Figure 122). Over 19,300 cases of notifiable diseases were reported in the three-year period. (**Note:** The sexually transmitted diseases (STDs) syphilis, gonorrhea, chlamydia, and HIV/AIDS are discussed in Section 3.4.3. Section 3.4.1 will discuss all notifiable diseases/conditions excluding STDs.) Table 35 presents the number of reported cases and incidence rates for the non-STD notifiable diseases for years 1998 through 2000. Over 4,000 cases of non-STD diseases were reported in Nashville during the three years with 1,476 cases reported in 1999. The incidence rate for 1999 was 259.0 per 100,000 population (Figure 123).



From 1998 to 2000, the incidence rate per 100,000 population for reported cases of all notifiable diseases/conditions in Nashville increased from 1,090.1 in 1998 to 1,250.8 in 2000.



#### ***Ten Most Frequently Reported Notifiable Diseases/Conditions***

The ten most frequently reported notifiable diseases/conditions in Nashville are presented in Table 36. Chlamydia, gonorrhea, and influenza were the three most frequently reported notifiable diseases each year from 1998 through 2000. Syphilis, which ranked 4<sup>th</sup> in 1999 and 2000, was fifth in 1998 as an outbreak of shigellosis moved that disease into the number four position. Shigellosis remained among the ten most frequently reported diseases in 1999 as the outbreak that began in 1998 continued. HIV/AIDS, tuberculosis, salmonellosis, and Vancomycin resistant enterococci were among the most frequently reported diseases each of the three years. Acute hepatitis A ranked number ten in reported cases in 2000.

Table 37 presents the ten most frequently reported notifiable diseases/conditions in Nashville when STDs and HIV/AIDS are excluded.

#### **References:**

1. Centers for Disease Control and Prevention. Summary of notifiable diseases, United States, 1999. *Morbidity and Mortality Weekly Report*. April 6, 2001/ Vol.48/No.53.
2. Tennessee Department of Health and Environment. *Regulations Governing Communicable Diseases in Tennessee*. 1987.
3. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. Preventing emerging infectious diseases. a strategy for the 21st century. 1998 [online]. Available at: <http://www.cdc.gov/ncidod/emergplan/planrequest.htm>. Accessed February 13, 2002.

Chlamydia, gonorrhea, and influenza were the three most frequently reported notifiable diseases each year from 1998 to 2000.



**Table 35. Number and Incidence of Reported Notifiable Diseases/Conditions, Excluding STDs/HIV/AIDS, Nashville, Tennessee, 1998 - 2000**

Disease	1998		1999		2000	
	Number of Cases	Incidence Rate <sup>^</sup>	Number of Cases	Incidence Rate <sup>^</sup>	Number of Cases	Incidence Rate <sup>^</sup>
Anthrax	0	0.0	0	0.0	0	0.0
Botulism	0	0.0	1	0.2	0	0.0
Brucellosis	0	0.0	0	0.0	0	0.0
Campylobacteriosis	16	3.0	34	6.0	40	7.0
Cholera	0	0.0	0	0.0	0	0.0
Cyclospora	0	0.0	0	0.0	0	0.0
Cryptosporidiosis	2	0.4	2	0.4	1	0.2
Diphtheria	0	0.0	0	0.0	0	0.0
Ehrlichiosis	1	0.2	3	0.5	4	0.7
Encephalitis, arboviral						
California/LaCrosse serogroup	0	0.0	0	0.0	0	0.0
Eastern Equine	0	0.0	0	0.0	0	0.0
St. Louis	0	0.0	0	0.0	0	0.0
Western Equine	0	0.0	0	0.0	0	0.0
West Nile-like	0	0.0	0	0.0	0	0.0
<i>Escherichia coli</i> 0157:H7	7	1.3	4	0.7	8	1.4
Giardiasis	23	4.3	28	4.9	23	4.0
Group A Strep Invasive Disease	3	0.6	13	2.3	15	2.6
Group B Strep Invasive Disease	0	0.0	0	0.0	2	0.4
<i>Haemophilus influenzae</i> Invasive Disease	9	1.7	5	0.9	6	1.1
Hantavirus Disease	0	0.0	0	0.0	0	0.0
Hemolytic Uremic Syndrome	0	0.0	0	0.0	0	0.0
Hepatitis A, Acute	44	8.2	50	8.8	43	7.5
Hepatitis B, Acute	45	8.4	22	3.9	38	6.7
Hepatitis B, HBsAg positive pregnant female	2	NA	3	NA	22	NA
Hepatitis C, Acute	4	0.7	22	3.9	18	3.2
Influenza	450	84.3	867	152.1	720	126.3
Legionellosis	0	0.0	1	0.2	0	0.0
Leprosy	0	0.0	0	0.0	0	0.0
Listeriosis	4	0.7	3	0.5	0	0.0
Lyme Disease	5	0.9	7	1.2	3	0.5
Malaria	2	0.4	0	0.0	4	0.7
Measles	0	0.0	0	0.0	0	0.0
Meningococcal Disease	9	1.7	4	0.7	7	1.2
Meningitis-Other Bacterial	8	1.5	5	0.9	7	1.2
Mumps	1	0.2	0	0.0	0	0.0
Pertussis	2	0.4	6	1.1	6	1.1
Plague	0	0.0	0	0.0	0	0.0
Poliomyelitis	0	0.0	0	0.0	0	0.0
Psittacosis	0	0.0	0	0.0	0	0.0
Rabies-Human	0	0.0	0	0.0	0	0.0
Rocky Mountain Spotted Fever	0	0.0	4	0.7	2	0.4
Rubella & Congenital Rubella Syndrome	0	0.0	0	0.0	0	0.0
Salmonellosis	58	10.9	56	9.8	72	12.6
Shigellosis	426	79.8	166	29.1	18	3.2
<i>Streptococcus pneumoniae</i> Invasive Disease						
Penicillin Resistant	22	4.1	52	9.1	42	7.4
Penicillin Sensitive	0	0.0	0	0.0	30	5.3
Tetanus	0	0.0	0	0.0	0	0.0
Toxic Shock Syndrome						
Staphylococcal	1	0.2	2	0.4	2	0.4
Streptococcal	1	0.2	0	0.0	1	0.2
Trichinosis	0	0.0	0	0.0	0	0.0
Tuberculosis-All Sites	74	13.9	60	10.5	81	14.2
Typhoid Fever	1	0.2	0	0.0	0	0.0
Vancomycin Resistant Enterococci	77	14.4	56	9.8	58	10.2
Varicella Deaths	0	0.0	0	0.0	0	0.0
Vibrio Infections	0	0.0	0	0.0	0	0.0
Yellow Fever	0	0.0	0	0.0	0	0.0
Yersiniosis	0	0.0	0	0.0	1	0.2
Total	1,297	242.9	1,476	259.0	1,274	223.6

<sup>^</sup>Denominator for calculating rate for 1998 was obtained from 1998 projected population data provided by Tennessee Department of Health. Denominator for calculating rates for 1999 and 2000 was U.S. Census 2000 data.

**Table 36. Ten Most Frequently Reported Notifiable Diseases or Conditions 1998 - 2000, Nashville, Tennessee**

	1998	1999	2000
1	Chlamydia (1,981)	Chlamydia (2,202)	Gonorrhea (2,404)
2	Gonorrhea (1,777)	Gonorrhea (1,785)	Chlamydia (2,403)
3	Influenza (450)	Influenza (867)	Influenza (720)
4	Shigellosis (426)	All Syphilis (506)	All Syphilis (522)
5	All Syphilis (416)	HIV (245)	AIDS (277)
6	HIV (203)	AIDS (191)	HIV (248)
7	AIDS (147)	Shigellosis (166)	Tuberculosis All Sites (81)
8	Vancomycin resistant enterococci (77)	Tuberculosis All Sites (60)	Salmonellosis (72)
9	Tuberculosis All Sites (74)	Salmonellosis (56)	Vancomycin resistant enterococci (58)
10	Salmonellosis (58)	Vancomycin resistant enterococci (56)	Hepatitis A (43)

Number of cases indicated in parenthesis.

**Table 37. Ten Most Frequently Reported Notifiable Diseases or Conditions Excluding STDs/HIV/AIDS, 1998 - 2000, Nashville, Tennessee**

	1998	1999	2000
1	Influenza (450)	Influenza (867)	Influenza (720)
2	Shigellosis (426)	Shigellosis (166)	Tuberculosis All Sites (81)
3	Vancomycin resistant enterococci (76)	Tuberculosis All Sites (60)	Salmonellosis (72)
4	Tuberculosis All Sites (74)	Salmonellosis (56)	Vancomycin resistant enterococci (58)
5	Salmonellosis (58)	Vancomycin resistant enterococci (56)	Acute hepatitis A (43)
6	Acute hepatitis B (45)	Penicillin resistant <i>streptococcus pneumoniae</i> Invasive Disease (52)	Penicillin resistant <i>streptococcus pneumoniae</i> Invasive Disease (42)
7	Acute hepatitis A (44)	Acute hepatitis A (50)	Campylobacteriosis (40)
8	Giardiasis (23)	Campylobacteriosis (34)	Acute hepatitis B (38)
9	Penicillin resistant <i>streptococcus pneumoniae</i> Invasive Disease (22)	Giardiasis (28)	Penicillin sensitive <i>streptococcus pneumoniae</i> Invasive Disease (30)
10	Campylobacteriosis (16)	Acute hepatitis B (22)	Giardiasis (23)
		Acute hepatitis C (22)	

Number of cases indicated in parenthesis.

### 3.4.1 Selected Notifiable Diseases/Conditions

The following sections will examine selected notifiable diseases by demographic characteristics and incidence. Where available, data will be presented comparing Nashville to other metropolitan areas of Tennessee, Tennessee, and the U.S. Information describing Nashville's progress towards achieving Healthy People 2010 objectives will be presented where appropriate.

Influenza (flu) is a continual public health challenge because the viruses that cause the disease are constantly changing. As a result, a new vaccine must be developed each flu season to combat the disease. With increased international travel, the fear always exists that a new type of flu virus could spread around the world quickly killing thousands of people, an influenza pandemic. This type of flu pandemic occurred in 1918 and 1919 killing more than 20 million people worldwide, approximately 500,000 in the U.S. alone. Other influenza pandemics occurred in 1957, Asian flu, and 1968, Hong Kong flu. Influenza is reported to the Metro Public Health Department by number of cases only, therefore, it is impossible to provide demographic information on those affected by this disease in Nashville.

Influenza (flu) is a continual public health challenge because the viruses that cause the disease are constantly changing.

### 3.4.1.1 Notifiable Diseases affecting the Gastrointestinal Tract

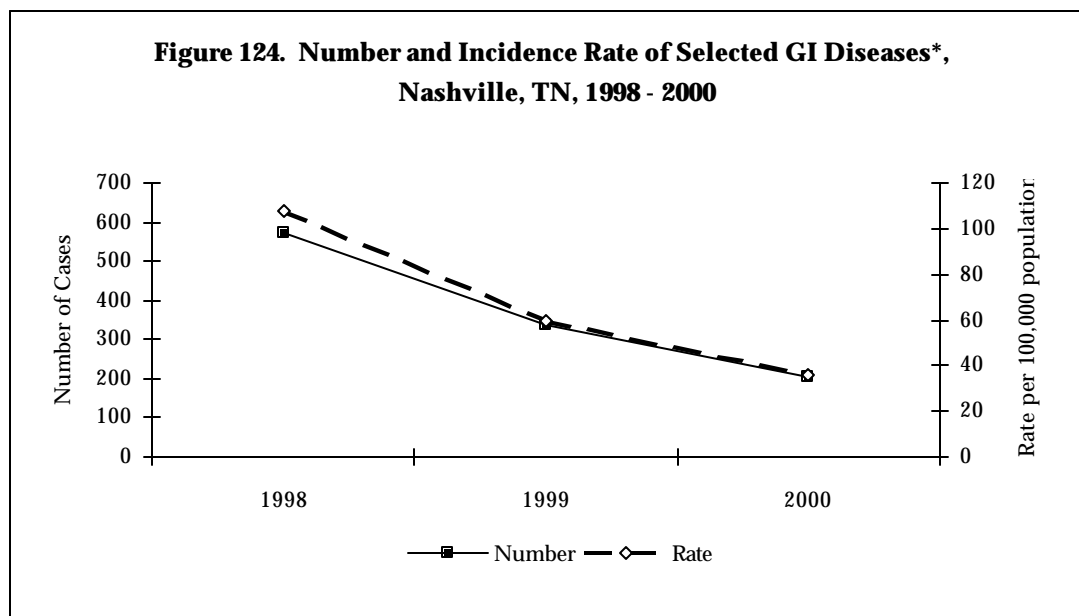
#### Background

Notifiable diseases that affect the gastrointestinal (GI) tract were consistently among the leading causes of morbidity between 1998 and 2000. The GI diseases most frequently reported to MPHD, transmitted through food, water, or other fecal-oral mechanism, include campylobacteriosis, *Escherichia coli* 0157:H7, giardiasis, salmonellosis, shigellosis, and hepatitis A. An outbreak of shigellosis occurred in Davidson and surrounding counties in 1998 and 1999. A concerted effort involving public health, medical providers, schools, and the media was required to control this outbreak that resulted in 426 confirmed cases in 1998 alone. Although the cost of this outbreak in the Nashville community is unknown, hospitalization costs for foodborne illnesses are estimated at over \$3 billion dollars a year in the U.S., and costs from lost productivity are much higher.<sup>1</sup> Seventy-four cases of giardiasis, an infection caused by a waterborne protozoan, were reported in Nashville during the three-year period. Increasingly in the U.S., the pathogens that cause waterborne diseases are resistant to routine disinfection methods. Of the waterborne outbreaks reported to the Centers for Disease Control and Prevention (CDC) during 1993 and 1994, more than half of those for which an infectious cause could be identified were due to chlorine-resistant microbes.<sup>1</sup>

From 1998 to 2000 in Nashville, 54.7% of the reported diseases affecting the GI tract were shigellosis.

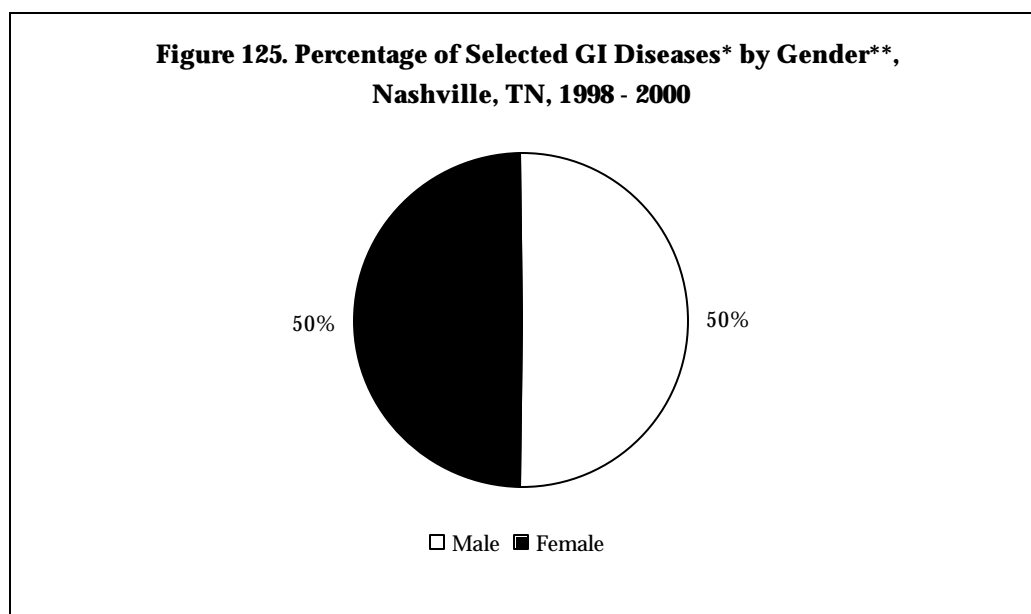
#### Findings

From 1998 to 2000 in Nashville, 54.7% of the reported diseases affecting the GI tract were shigellosis followed by salmonellosis, hepatitis A, campylobacteriosis, giardiasis, and *Escherichia coli* 0157:H7. As the shigellosis outbreak came under control in 1999, the incidence rate for the GI diseases declined from 107.5 per 100,000 population in 1998 to 35.8 in 2000 (Figure 124).



\*Includes campylobacteriosis, *Escherichia coli* 0157:H7, giardiasis, salmonellosis, shigellosis, and hepatitis A

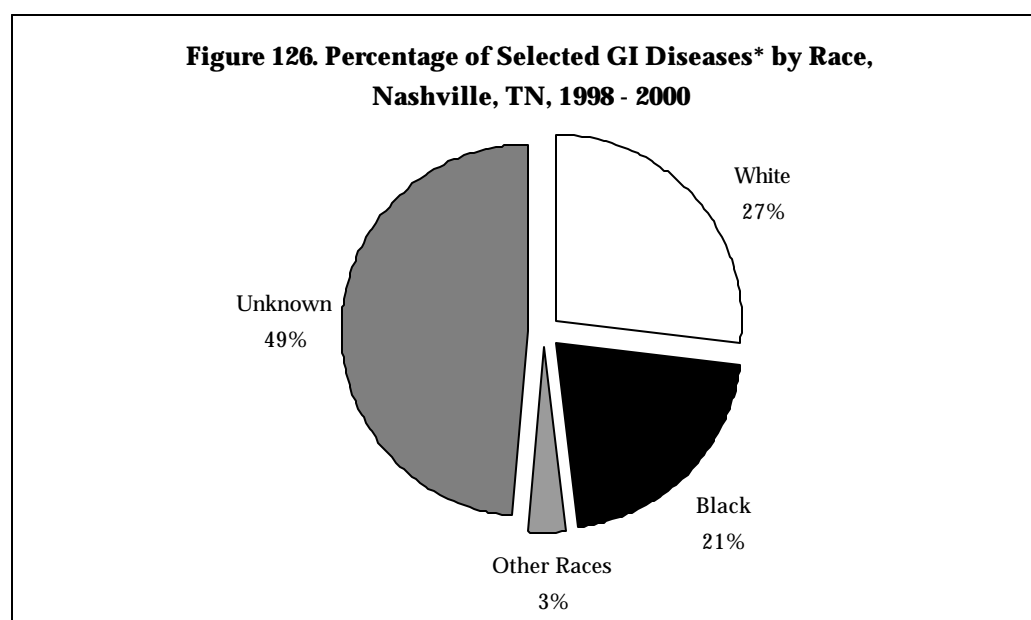
Reported GI diseases were present equally in the male and female populations (Figure 125).



\*Includes campylobacteriosis, *Escherichia coli* 0157:H7, giardiasis, salmonellosis, shigellosis, and hepatitis A

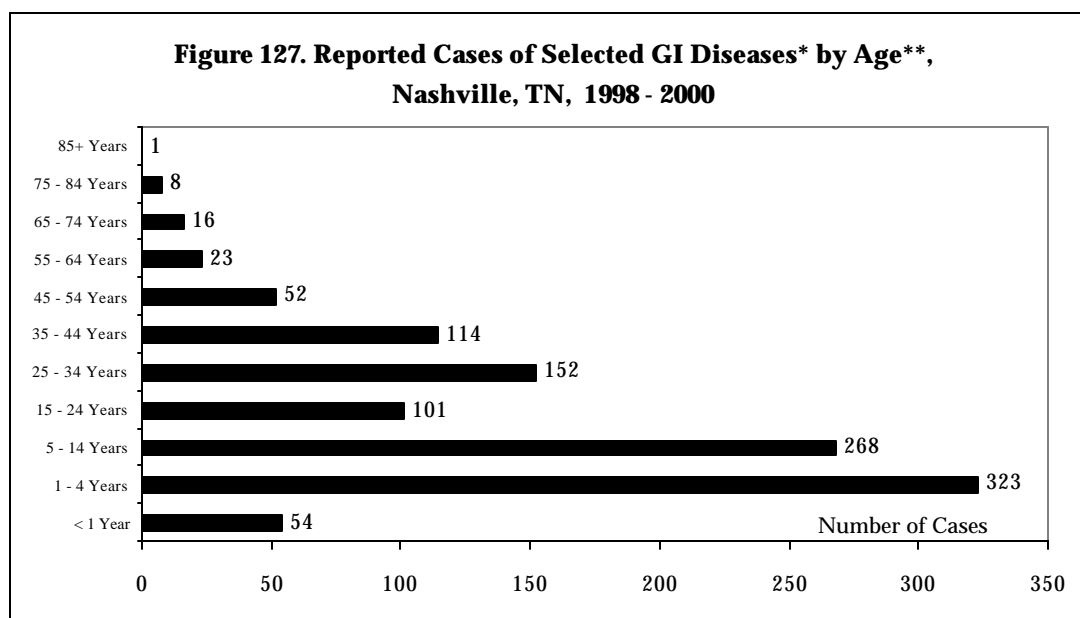
\*\*Gender unknown for 5 cases

As seen in Figure 126, race information was not available for 49% of the cases of GI diseases, 27% of cases were white, 21% were black, and 3% were of other races.



\*Includes campylobacteriosis, *Escherichia coli* 0157:H7, giardiasis, salmonellosis, shigellosis, and hepatitis A

The reported GI cases occurred predominantly among the youngest residents of Nashville (Figure 127). Thirty-three percent of cases were among children 4 years of age and younger; 57.8% of cases were under the age of 25.



\*Includes campylobacteriosis, *Escherichia coli* 0157:H7, giardiasis, salmonellosis, shigellosis, and hepatitis A

\*\*Age unknown for 4 cases

When compared to the three other large metropolitan areas of the state, in the year 2000 Nashville ranked third to Knoxville and Memphis in number of reported cases of the selected gastrointestinal diseases (Table 38). Nashville's rate of 35.8 per 100,000 was higher than the rate for Tennessee (30.4). Only provisional 2000 data is available for the U.S. and only for selected diseases. Nashville's rate of disease was less than the U.S. rate for *Escherichia coli* 0157:H7, salmonellosis, and shigellosis. However, the incidence rate of hepatitis A in Nashville, 7.5, exceeded the rate for the U.S., 4.4.

Healthy People 2010 Objective 14-6 calls for the reduction of hepatitis A cases to 4.5 cases per 100,000 population. From 1998 - 2000, Nashville's incidence rate remained above the objective (Figure 128).

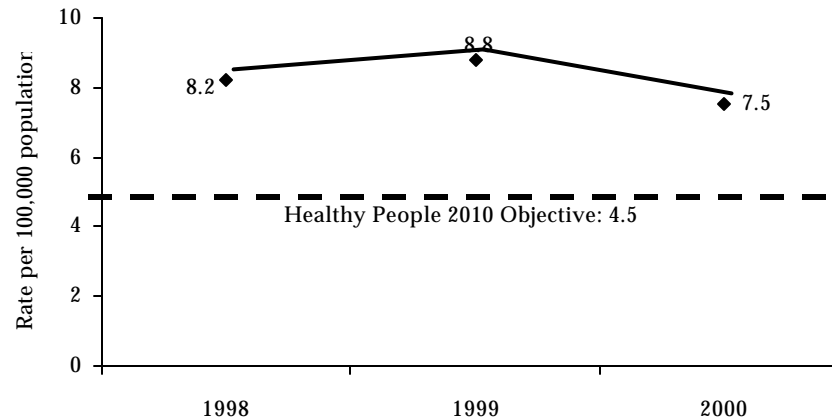
Other diseases on the list of notifiable diseases/conditions may affect the gastrointestinal tract or be spread through the food or water. This list includes botulism, cholera, listeriosis, brucellosis, cyclospora, cryptosporidiosis, trichinosis, and yersiniosis. Fifteen cases of these diseases were reported in Nashville from 1998 - 2000. Eight cases of listeriosis were reported in this period. Listeriosis is a bacterial disease whose transmission has been associated with contaminated milk, cheese, and vegetables. Five cases of cryptosporidiosis were reported in Nashville during the three-year period. *Cryptosporidium* caused the largest single waterborne disease outbreak in the U.S. in 1993, affecting more than 400,000 people.

**Table 38. Comparison of Selected Gastrointestinal Diseases, Nashville, Memphis, Knoxville, Chattanooga, Tennessee, and U.S.\*, 2000**

Area	All Selected Gastrointestinal Diseases		Campylobacteriosis		Escherichia coli 0157:H7		Giardiasis		Hepatitis A		Salmonellosis		Shigellosis	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Nashville	204	35.8	40	7.0	8	1.4	23	4.0	43	7.5	72	12.6	18	3.2
Memphis	264	29.4	27	3.0	1	0.1	27	3.0	34	3.8	115	12.8	60	6.7
Knoxville	285	74.6	41	10.7	6	1.6	19	5.0	9	2.4	53	13.9	157	41.1
Chattanooga	46	14.9	8	2.6	2	0.6	8	2.6	3	1.0	22	7.1	3	1.0
Tennessee	1,728	30.4	280	4.9	61	1.1	183	3.2	153	2.7	697	12.3	354	6.2
U.S.	NA**		NA		4,410	1.6	NA		12,275	4.4	36,762	13.1	20,721	7.4

\*U.S. data provisional taken from MMWR, January 5, 2001/Vol.49/Nos.51&52. Rate calculated using 2000 census population.

\*\* Not available

**Figure 128. Incidence Rate of Hepatitis A Compared to Healthy People 2010 Objective, Nashville, TN, 1998 - 2000**

### Discussion

Understanding the method of spread of these diseases and the fact that predominantly children were affected by the diseases in the period 1998 - 2000, it is easy to understand why information pertaining to the importance of and proper techniques for good hand-washing provided in schools and through the media were effective in helping to control the shigellosis outbreak in 1998 and 1999. Ongoing education pertaining to hand-washing is provided by the Division of Notifiable Disease Control/Immunization Promotion within the community and the school system. In addition, the Division of Food Protection inspects all establishments within the county that serve food to the public at least twice per year. Staff of the Division of Food Protection also participate in a variety of food protection training programs, some provided in Chinese and Spanish as well as English, designed to educate the community at large as well as managers and employees of food establishments. For more information about MPHD's Food Protection Division refer to Section 2.1.2.6.

#### Reference:

1. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. Preventing emerging infectious diseases. a strategy for the 21<sup>st</sup> century [online]. 1998. Available at: <http://www.cdc.gov/ncidod/emergplan/planrequest.htm>. Accessed February 13, 2002.

Information pertaining to the importance of and proper techniques for good hand-washing provided in schools and through the media were effective in helping to control the shigellosis outbreak in 1998 and 1999.



### 3.4.1.2 Tuberculosis

#### Background

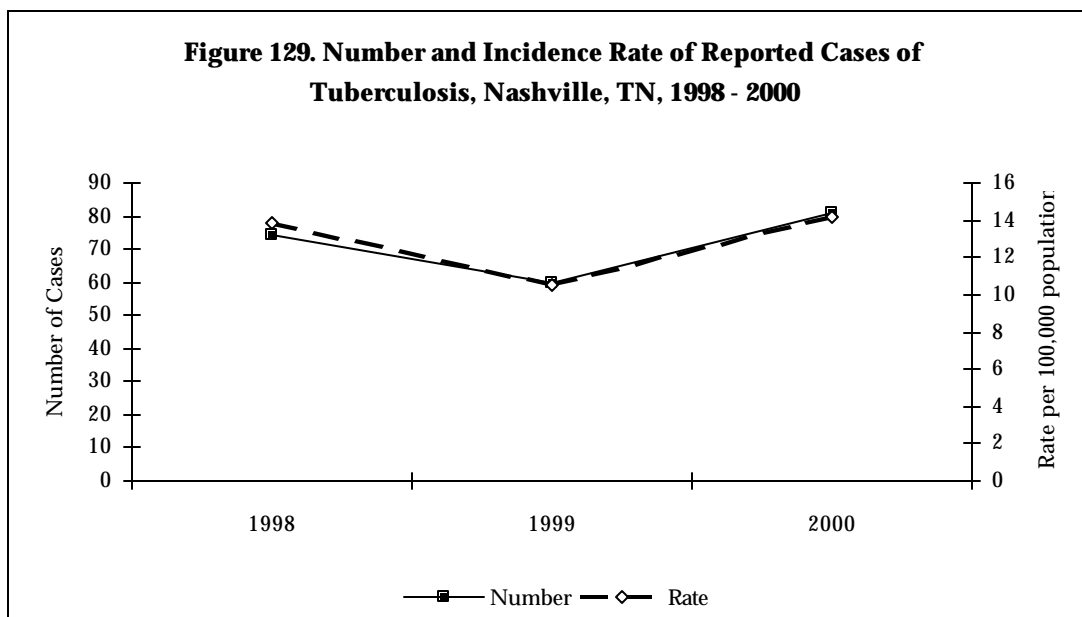
Nationwide reporting of tuberculosis (TB) began in 1953. That year there were 84,000 cases reported. Reported cases declined every year through 1984 by an average of 6%. However, between 1985 and 1992, the trend reversed and reported cases increased by 20% in the U.S. This increase was attributed to four factors: 1) the HIV epidemic, 2) immigration from countries where TB is common, 3) spread of TB in specific environments such as correctional facilities and homeless shelters, and 4) inadequate funding for TB control and other public health efforts.<sup>1</sup> From 1992 – 2000, additional resources were directed towards combating the resurgence of TB with a resulting decline in cases. In 2000, there were 16,377 cases of TB reported in the U.S., the fewest cases reported since 1953.<sup>2</sup>

Although diagnosis and treatment of tuberculosis have always been a challenge, these challenges are greater today. TB patients who do not complete the entire course of their medication therapy can develop, and spread, a strain of TB that is resistant to many of the drugs available to treat the disease. One case of multi-drug resistant TB can cost \$1 million to treat. An increasing number of the reported cases of TB are among foreign-born persons, 46% of cases in 2000 in the U.S. Persons exposed to TB disease may develop latent TB infection (LTBI). There are an estimated 10 to 15 million people in the U.S. with LTBI. About 10% of these people will develop TB disease at some time in their lives. People co-infected with HIV and TB are up to 800 times more likely to develop active TB disease during their lifetime than people without HIV infection.<sup>2</sup>

Although diagnosis and treatment of tuberculosis have always been a challenge, these challenges are greater today.

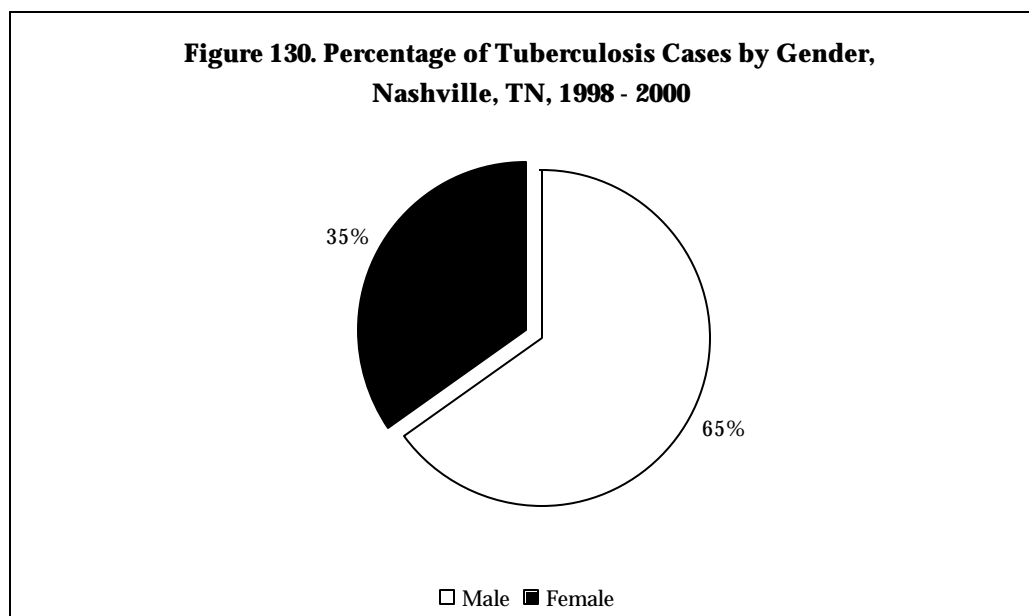
#### Findings

Nashville did not follow the national trend of fewest reported cases of TB in 2000. Figure 129 presents number of cases and incidence rate of TB in Nashville from 1998 to 2000. Although the number of cases declined in 1999, there was a 25.9% increase in reported cases from 1999 (60 cases) to 2000 (81 cases).



Eighty-four percent of the reported TB cases (180 cases) from 1998 to 2000 were pulmonary TB. The major site of TB infection in the other cases (35 cases) included pleural, lymphatic/cervical, lymphatic/intrathoracic, lymphatic other, bone and/or joint, genitourinary, miliary, meningeal, peritoneal, and other.

Sixty-five percent of reported tuberculosis cases were among males and 35% of cases were among females from 1998 to 2000 in Nashville (Figure 130).



Twice as many cases of tuberculosis were of the black race as compared to whites between 1998 and 2000 (131 cases/66 cases). Six percent of cases were among persons of other races (Figure 131). When examining tuberculosis cases by ethnicity over the three year period, the great majority of cases, 96%, were non-Hispanic.

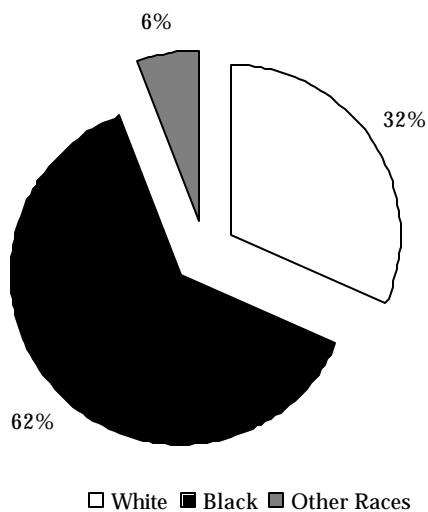
One quarter of new cases of TB occurred in persons between the ages of 35 and 44 in years 1998 to 2000 (53 cases/24.6%). Over half of the reported cases during the 3 - year period were in persons between the ages of 25 and 54 (126 cases/58.6%) (Figure 132).

Nashville's percentage of foreign-born cases in 2000 was well below the national level of 46%. In 1999, 26.7% of reported cases of tuberculosis were among foreign-born persons, decreasing only slightly in 2000 to 25.9% of cases. During the three-year period, 52 of the 215 cases were foreign-born. These foreign-born cases were from twenty different countries. Over half (51.9%) came from four countries: Somalia, Ethiopia, India, and Sudan (Figure 133).

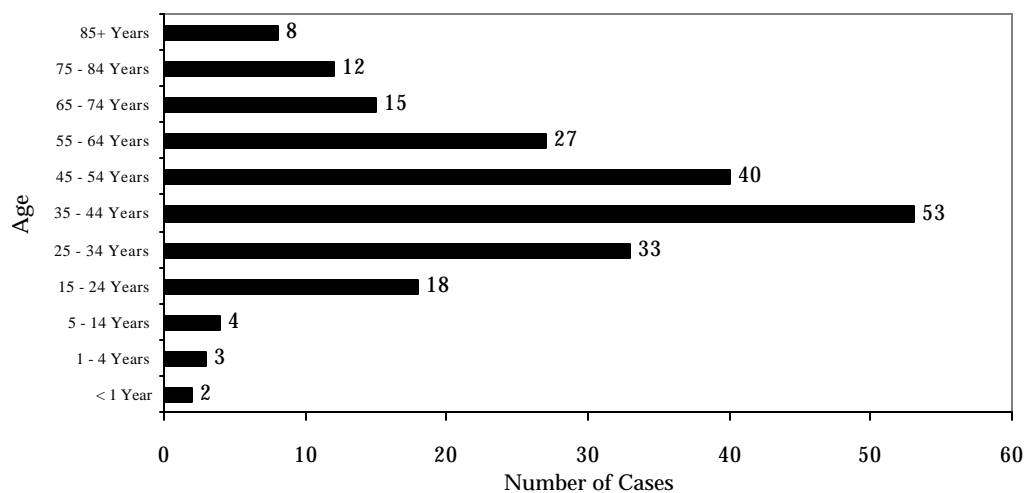
A total of 60 tuberculosis cases were also homeless during the years 1998 to 2000. The fewest homeless cases occurred in 2000 with a total of 18 cases (22.2% of cases) down from 22 cases (36.7%) in 1999. Nationwide in 2000, 6.1% of tuberculosis cases were homeless (Figure 134).

Approximately 10% - 15% of the national total of TB cases are reported among persons living with HIV. <sup>2</sup> In Nashville from 1998 to 2000, 15.3% of the tuberculosis cases were living with HIV (Figure 135).

**Figure 131. Percentage of Tuberculosis Cases by Race\*, Nashville, TN, 1998 - 2000**

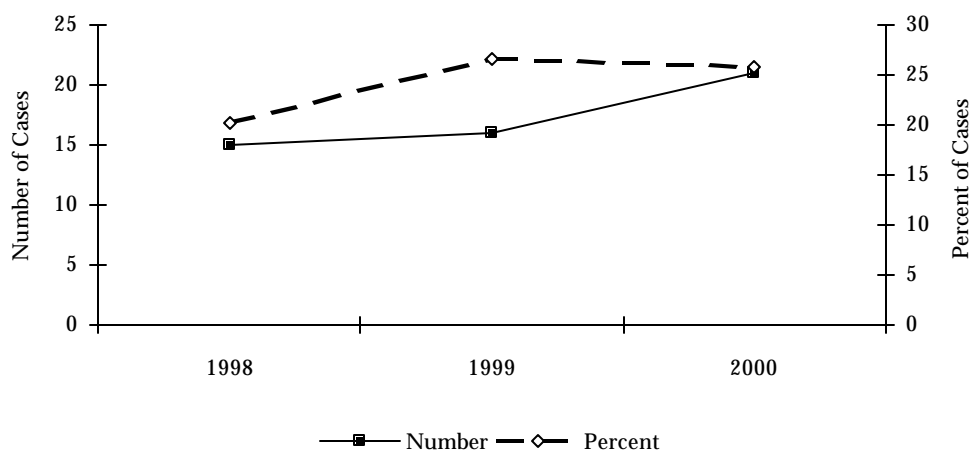


**Figure 132. Reported Cases of Tuberculosis by Age, Nashville, TN, 1998 - 2000**

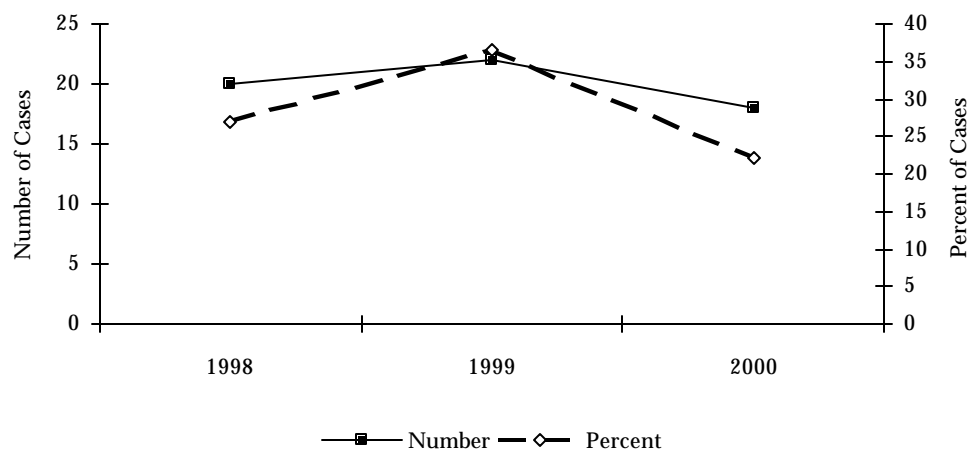


Although the number of cases declined in 1999, there was a 25.9% increase in reported cases from 1999 (60 cases) to 2000 (81 cases).

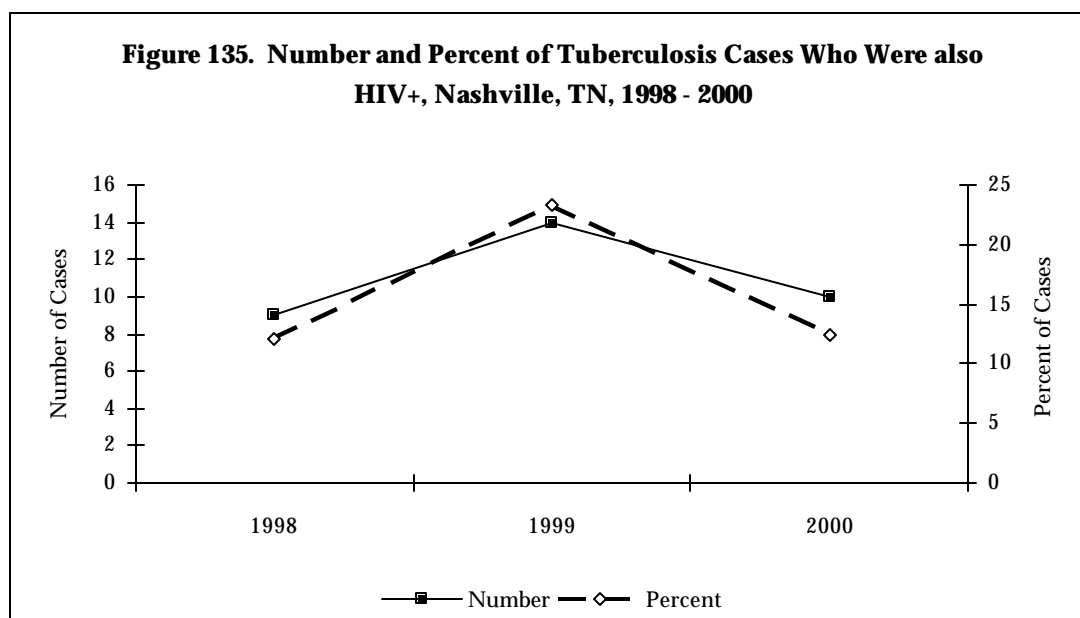
**Figure 133. Number and Percent of Foreign-born Tuberculosis Cases, Nashville, TN, 1998 - 2000**



**Figure 134. Number and Percent of Tuberculosis Cases Who Were also Homeless, Nashville, TN, 1998 - 2000**



Eighty-four percent of the reported TB cases (180 cases) from 1998 to 2000 were pulmonary TB.



**Table 39. Comparison of Number and Incidence Rates of New Tuberculosis Cases , Nashville, Memphis, Knoxville, Chattanooga, Tennessee, and U.S.\* , 2000**

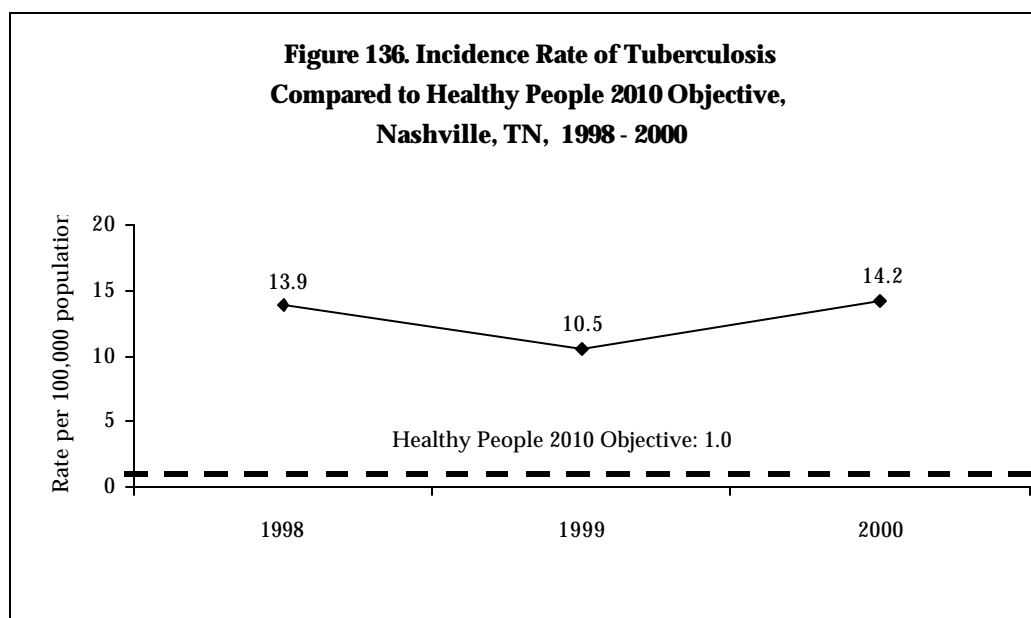
Area	Tuberculosis	
	Number	Rate
<b>Nashville</b>	81	14.2
<b>Memphis</b>	80	8.9
<b>Knoxville</b>	19	5.0
<b>Chattanooga</b>	24	7.8
<b>Tennessee</b>	383	6.7
<b>U.S.</b>	12,942	4.6

\*U.S. number is provisional taken from MMWR, January 5, 2001/Vol.49/Nos.51&52. Rate calculated using 2000 U.S. census population.

Nashville's rate was more than double the rate for Tennessee (14.2 / 6.7) and more than three times the provisional 2000 rate for the U.S.

In 2000, Nashville led the three other metropolitan areas and Tennessee in the incidence rate for tuberculosis. Nashville's rate was more than double the rate for Tennessee (14.2 / 6.7) and more than three times the provisional 2000 rate for the U.S. (Table 39).

Healthy People 2010 Objective 14-11 calls for the reduction of the incidence rate for tuberculosis from the 1998 baseline of 6.8 to 1.0. Nashville's incidence rate per 100,000 in 1999, the lowest of the three years 1998 to 2000, was greater than 10 times the 2010 Objective (Figure 136).



### Discussion

Nationally, several factors are thought to have contributed to the decline in reported tuberculosis cases since 1992. Activities were aimed at quickly identifying people with TB, beginning them on the appropriate medications as soon as possible, and making sure that they completed the entire course of medications in a timely manner. The incidence of AIDS declined. The number of cases of TB that were resistant to multiple drugs decreased. Infection control practices in health care settings and areas where large numbers of persons reside, i.e., prisons or nursing homes, improved.<sup>3</sup>

The Advisory Council for the Elimination of Tuberculosis and a report from the Institute of Medicine, *Ending Neglect: The Elimination of Tuberculosis in the United States*, have both emphasized that the current efforts directed at tuberculosis management need to be maintained and enhanced if the United States is to move from TB control to TB elimination. Locally, MPHD provides multiple services aimed at preventing the spread of active TB disease and preventing persons with LTBI from developing disease. Directly observed therapy (DOT), as recommended by the CDC, is the standard of care for all persons in Nashville who are suspected of having or who do have active tuberculosis. MPHD TB staff observe each of these patients taking their medications throughout the duration of treatment. This is one way of ensuring that people do not forget doses of medication which may lead to drug resistant TB and the continued spread of active TB disease. Social services assist those persons with TB with basic necessities if they are restricted from work and social activities. Outreach activities focus on specific educational presentations identifying the difference between active disease and latent TB infection. These activities recognize the various cultural beliefs of different groups of people and need for information in multiple languages. For additional information about the work of the Division of Tuberculosis Elimination, please call 615-340-5650.

## References:

1. Centers for Disease Control and Prevention. Self study modules on tuberculosis. module2: epidemiology of tuberculosis. 1999 [online]. Available at: <http://www.phppo.cdc.gov/PHTN/tbmodules/modules1-5/m2/2-m-02.htm>. Accessed March 11, 2002.
2. Centers for Disease Control and Prevention. TB elimination: now is the time. 2002 [online]. Available at: <http://www.cdc.gov/nchstp/tb>. Accessed March 8, 2002.
3. National Center for HIV, STD and TB Prevention. Division of TB Elimination. *Reported TB in the U.S. 2000*. Centers for Disease Control and Prevention: October 2, 2001.

Directly observed therapy (DOT), as recommended by the CDC, is the standard of care for all persons in Nashville who are suspected of having or who do have active tuberculosis.

### 3.4.1.3 Notifiable Conditions Related to Antimicrobial Resistance

#### Background

Antimicrobial drugs altered the treatment and method of health care for many diseases that once caused serious illness and death. However, widespread use and misuse of these drugs have reduced their effectiveness over the years as many microbes have developed resistance to the drugs. Antimicrobial resistance occurs when microbes adapt to survive the use of medications meant to kill or weaken them, making the infection more difficult or impossible to treat. A person infected with a resistant organism can pass that resistant organism to another person, allowing the resistant organism to spread from person-to-person.<sup>1</sup>

One hundred sixteen cases of penicillin resistant *Streptococcus pneumoniae* invasive disease were reported in Nashville from 1998 to 2000.

Bacteria, fungi, and viruses can become resistant to drugs.<sup>2</sup> Antimicrobial resistant strains have developed in many microbes once considered easily treatable, such as those that cause tuberculosis, malaria, ear infections, pneumonia, and some foodborne infections. People infected with drug-resistant organisms require hospitalization more frequently, are in the hospital for longer periods of time, and are more likely to die as a result of the infection. There are increasingly limited options to treat resistant infections, and the drugs may be less effective, more toxic, more expensive, and more difficult to administer. A 1995 U.S. government report estimated that antimicrobial resistance among six common bacteria in hospitals adds approximately \$661 million per year in hospital charges. This is an underestimate because it does not include indirect costs, such as costs of lost days of work.<sup>1</sup>

In Tennessee, penicillin resistant *Streptococcus pneumoniae* (DRSP) and Vancomycin resistant enterococci (VRE) are on the list of notifiable diseases and conditions.

#### Findings

Figure 137 may be used to compare DRSP and VRE. One hundred sixteen cases of penicillin resistant *Streptococcus pneumoniae* invasive disease were reported in Nashville from 1998 to 2000. These cases were evenly divided among males and females. Race information was unavailable for 44% of cases; 43% were white; 13% were black, and no cases were reported among persons of other races. Forty-one percent (47 cases) of the cases were in children under the age of 5 years, and one half of the cases were 35 years of age and older.

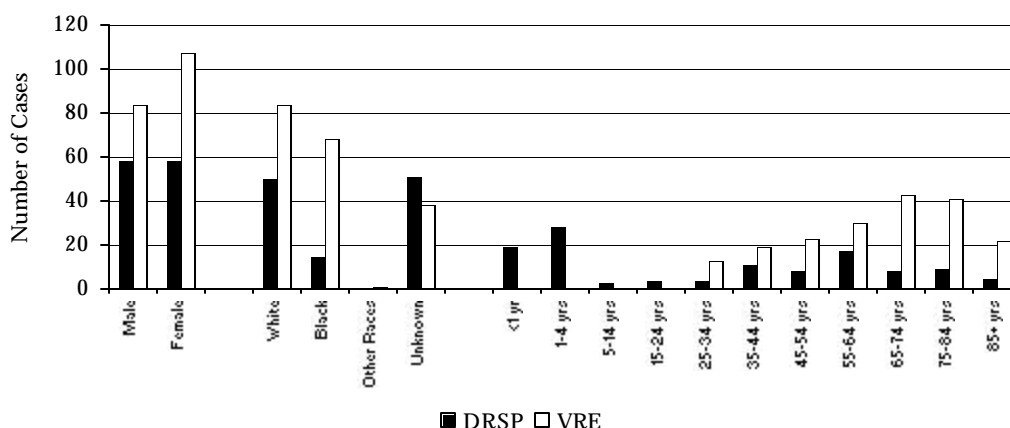
In 2000, the incidence rate per 100,000 population for DRSP was 7.4, down from 9.1 in 1999. Nashville ranked third of the four largest metropolitan areas of Tennessee in reported cases and incidence rate of penicillin resistant *Streptococcus pneumoniae* in 2000. However, Nashville's incidence rate of 7.4 was greater than the rate for Tennessee (4.7) (Table 40).

Of the 191 cases of VRE reported in Nashville between 1998 and 2000, 56% were female. Forty-three percent of the cases were white, followed by 36% black, and 1% other races. Race information was not available for 20% of the cases. Greater than one half of the cases were over the age of 64 (106 cases/55.5%).

The 2000 incidence rate of 10.2 per 100,000 population for VRE was up from 9.8 in 1999. Comparing VRE among the metropolitan areas of Tennessee, Nashville ranked second to Memphis both in number of reported cases and incidence rate in 2000 (Table 40).



**Figure 137. Comparison of DRSP and VRE by Gender, Race, and Age, Nashville, TN, 1998 - 2000**



Of the 191 cases of VRE reported in Nashville between 1998 and 2000, 56% were female.

**Table 40. Comparison of Number and Incidence Rates of DRSP and VRE, Nashville, Memphis, Knoxville, Chattanooga, and Tennessee, 2000**

Area	DRSP		VRE	
	Number	Rate	Number	Rate
Nashville	42	7.4	58	10.2
Memphis	51	5.7	239	26.6
Knoxville	49	12.8	12	3.1
Chattanooga	26	8.4	12	3.9
Tennessee	266	4.7	524	9.2

\*U.S. data not available

## Discussion

Each year in the U.S. *Streptococcus pneumoniae* infections cause 100,000 to 135,000 hospitalizations for pneumonia, 6 million ear infections, and 3,300 cases of meningitis. Forty percent of these infections are drug resistant.<sup>3</sup>

Enterococci are bacteria that are found in the intestine of nearly all animals. Each year enterococci cause approximately 110,000 urinary tract infections, 25,000 cases of bacteremia, 40,000 wound infections, and 1,100 cases of endocarditis in the U.S. Most of these infections occur in hospitalized patients.<sup>4</sup> Enterococci are increasingly found to be resistant to Vancomycin, the antibiotic used when all other licensed drugs are ineffective. Vancomycin-resistant enterococci were first reported in Europe in 1988. From 1989, the year VRE was identified in the U.S., through 1993 the percentage of hospital-acquired infections caused by VRE increased by 20-fold (from 0.3% to 7.9%).<sup>5</sup>

In order to address this growing problem, the Tennessee Department of Health (TDH) has begun a statewide Appropriate Antibiotic Use Campaign. The campaign will focus on educating parents and health care providers about the importance of appropriate antibiotic use and risks of resistance. In the spring of 2002, clinicians, parents, pharmaceutical companies, day care center staff, and other interested parties formed a coalition to get the message out about proper antibiotic use. MPH is a member of the coalition and will work to address the appropriate use of antibiotics in Nashville.

References:

1. U.S. Department of Health and Human Services. Antimicrobial resistance: the public health response fact sheet. 2001 [online]. Available at: <http://www.hhs.gov/news/press/2001pres/01fsdruresistance.html>. Accessed March 3, 2002.
2. National Center for Infectious Diseases. Centers for Disease Control and Prevention. Antimicrobial resistance: a growing threat to public health. 2001 [online]. Available at: [http://www.cdc.gov/ncidod/hip/ARESIST/am\\_res.htm](http://www.cdc.gov/ncidod/hip/ARESIST/am_res.htm). Accessed March 3, 2002.
3. Centers for Disease Control and Prevention. Drug-resistant *streptococcus pneumoniae* disease fact sheet. 2001 [online]. Available at: [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/drugresisstreppneum\\_t.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/drugresisstreppneum_t.htm). Accessed March 3, 2002.
4. Huycke Mark M, Sahm D, Gilmore, M. Multiple-drug resistant enterococci: the nature of the problem and an agenda for the future. *Emerging Infectious Diseases* 1998; Vol 4 No 2 [online]. Available at: <http://www.cdc.gov/ncidod/eid/vol4no2/huycke.htm>. Accessed March 3, 2002.
5. McDonald L, Kuehnert M, Tenover F, Jarvis W. Vancomycin-resistant enterococci outside the health-care setting: prevalence, sources, and public health implications. *Emerging Infectious Diseases* 1997; Vol3 No3 [online]. Available at: <http://www.cdc.gov/ncidod/eid/vol3no3/mcdonald.htm>. Accessed March 3, 2002.

From 1989, the year VRE was identified in the U.S., through 1993 the percentage of hospital-acquired infections caused by VRE increased by 20-fold (from 0.3% to 7.9%).

### 3.4.1.4 Hepatitis B and C

#### Background

Only acute cases of hepatitis B and C and hepatitis B occurring among pregnant women are on the list of notifiable diseases/conditions in Tennessee. After acute infection with hepatitis B virus (HBV), the risk of developing chronic infection is associated inversely with age; chronic HBV infection occurs among about 90% of infants infected at birth, 20% - 50% of children infected at 1 to 5 years of age, and about 1% to 10% of persons infected as older children and adults. An estimated 15% to 25% of persons with chronic HBV infection will die prematurely of either cirrhosis or liver cancer. HBV may be the cause of up to 80% of cases of liver cancer worldwide, second only to tobacco among known human carcinogens.<sup>1</sup>

Hepatitis C virus (HCV) infection is the most common chronic blood-borne infection in the U.S.

Hepatitis C virus (HCV) infection is the most common chronic blood-borne infection in the U.S. The CDC estimates that during the 1980s, an average of 242,000 new infections occurred each year. Since 1989, the annual number of new infections has declined by > 80% to 36,000 by 1996. It is estimated that 3.9 million (1.8%) Americans have been infected with HCV. Most of these persons are chronically infected and may not be aware of the infection because they do not exhibit symptoms. However, they may serve as a source of transmission to others and are at risk for chronic liver disease during the first two or more decades following initial infection. Population based studies indicate that 40% of chronic liver disease is HCV-related with a resulting 8,000 to 10,000 deaths per year. Current estimates of medical and work-loss costs of HCV-related acute and chronic liver disease are > \$600 million annually. HCV-associated end-stage liver disease is the most frequent indication for liver transplantation among adults.<sup>2</sup>

#### Findings

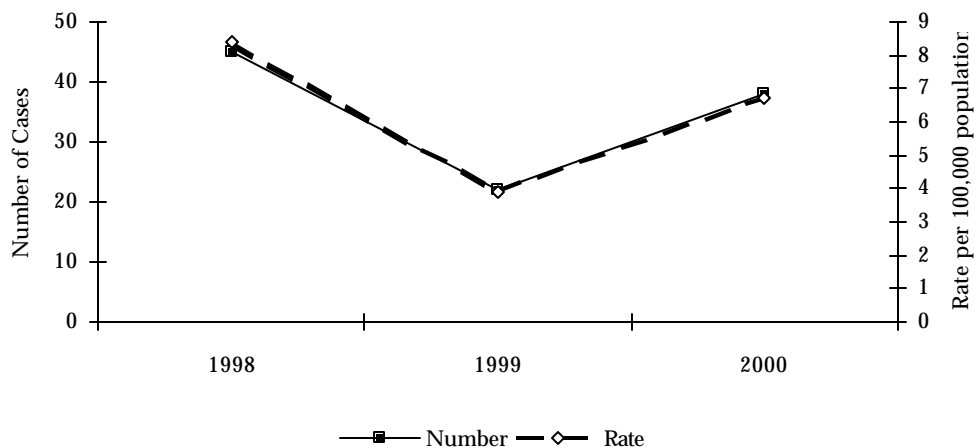
More than twice as many cases of acute hepatitis B (105 cases) than acute hepatitis C (44 cases) were reported in Nashville during the 1998 to 2000 period. The incidence rate for acute hepatitis B rose from 1999 to 2000 while the incidence rate for acute hepatitis C declined slightly during the same period. The number of reported cases of hepatitis B in pregnant women increased from 2 cases in 1998 to 22 cases in 2000, a 1,000% increase (Figures 138 - 140).

Both acute hepatitis B and C were reported more frequently among males than females. Overall, 52% of reported cases of these diseases were male. Figure 141 may be used to compare gender, race, and age for acute hepatitis B and C.

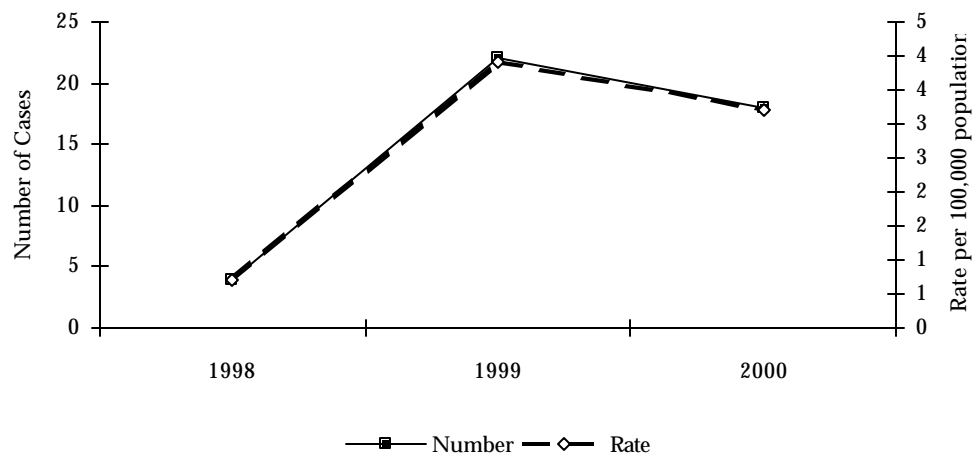
Race information was unavailable for 38% of acute hepatitis B and C cases; 36% were white; 22% were black; and 4% were of other races. However, the race distribution differs when looking at hepatitis B infection among pregnant women during the three-year period. While race information was unavailable for 44% of the cases, hepatitis B infection in pregnant women was found more frequently among women of other races (33%) followed by black (19%) and white (4%)(Figure 142).

Both acute hepatitis B and C affected persons between the ages of 35 and 44 years most frequently with 40% of the cases falling within this age group. Sixty percent of pregnant women with hepatitis B infection were between the ages of 25 and 34.

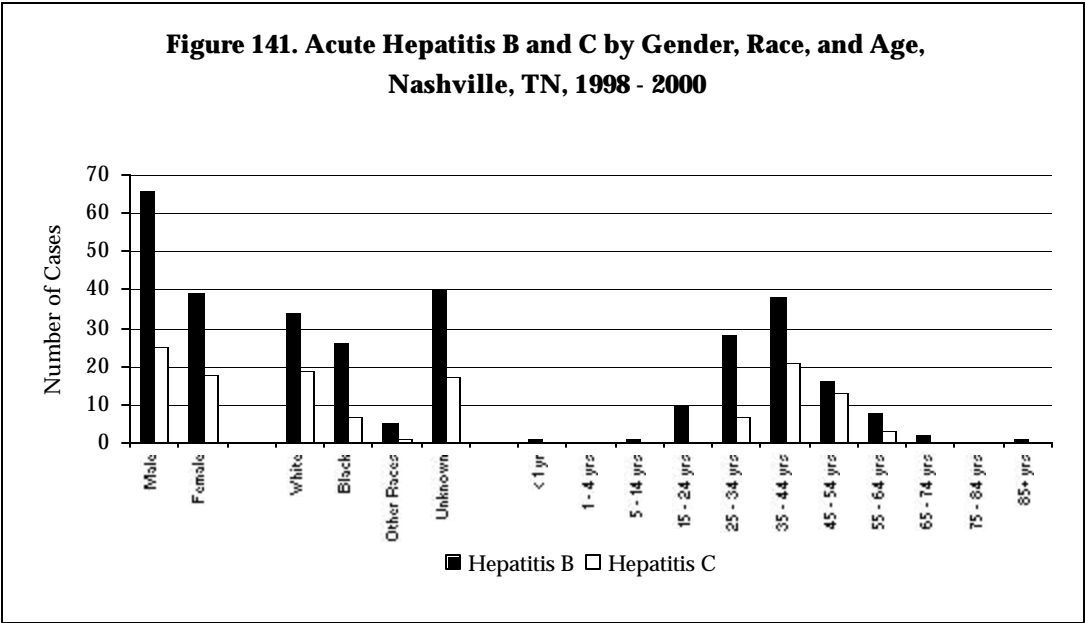
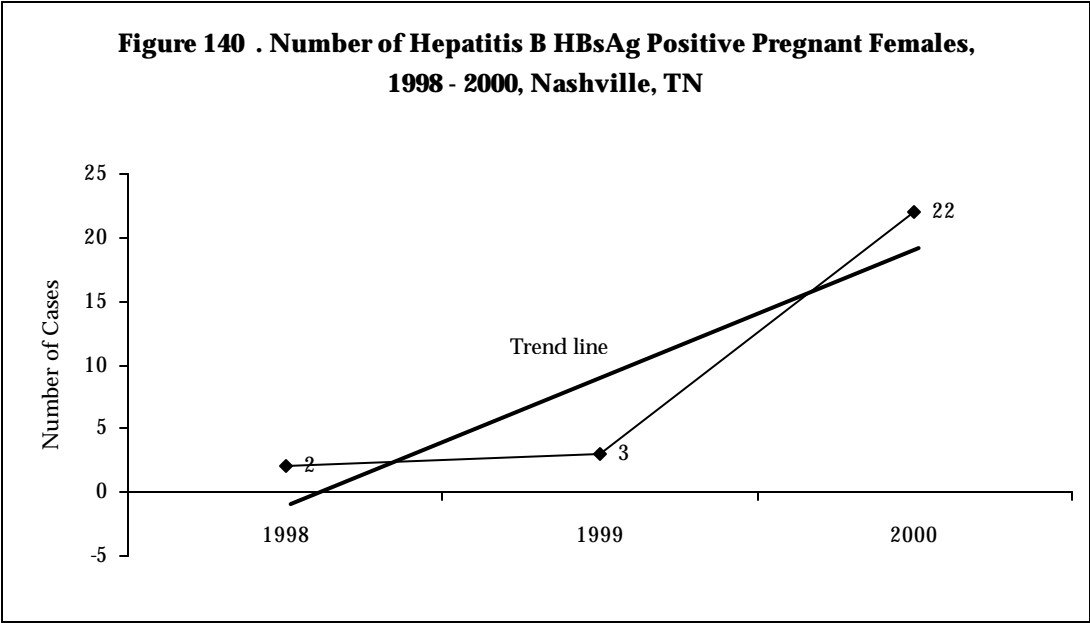
**Figure 138. Number and Incidence Rate of Acute Hepatitis B, Nashville, TN, 1998 - 2000**



**Figure 139. Number and Incidence Rate of Acute Hepatitis C, Nashville, TN, 1998 - 2000**

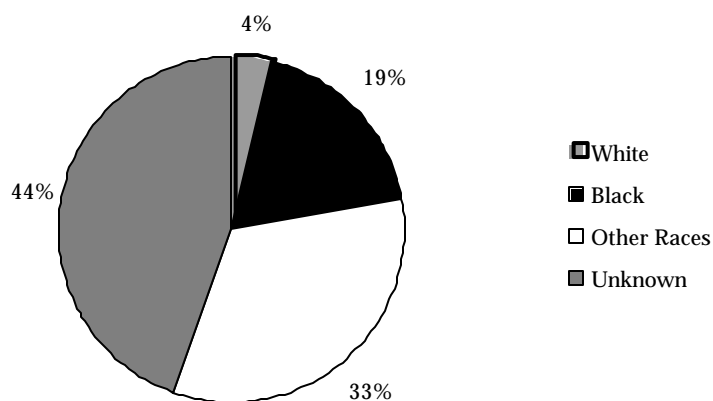


More than twice as many cases of acute hepatitis B (105 cases) than acute hepatitis C (44 cases) were reported in Nashville during the 1998 to 2000 period.



Nashville's incidence rates for both acute hepatitis B and C were above that of the Tennessee rate for the year 2000.

**Figure 142. Percentage of Hepatitis B, HBsAg Positive Pregnant Females by Race, Nashville, TN, 1998 - 2000**



Nashville's incidence rates for both acute hepatitis B and C were above that of the Tennessee rate for the year 2000 (Table 41). Nashville ranked second to Memphis for incidence per 100,000 population for acute hepatitis B and second to Chattanooga for incidence per 100,000 for acute hepatitis C in the same year. Examining the provisional U.S. 2000 data, Nashville's rate for hepatitis B was more than double the U.S. rate, and the hepatitis C rate was three times greater than that of the U.S.

**Table 41. Comparison of Number and Incidence Rates of Acute Hepatitis B and C, Nashville, Memphis, Knoxville, Chattanooga, Tennessee, and U.S.\*, 2000**

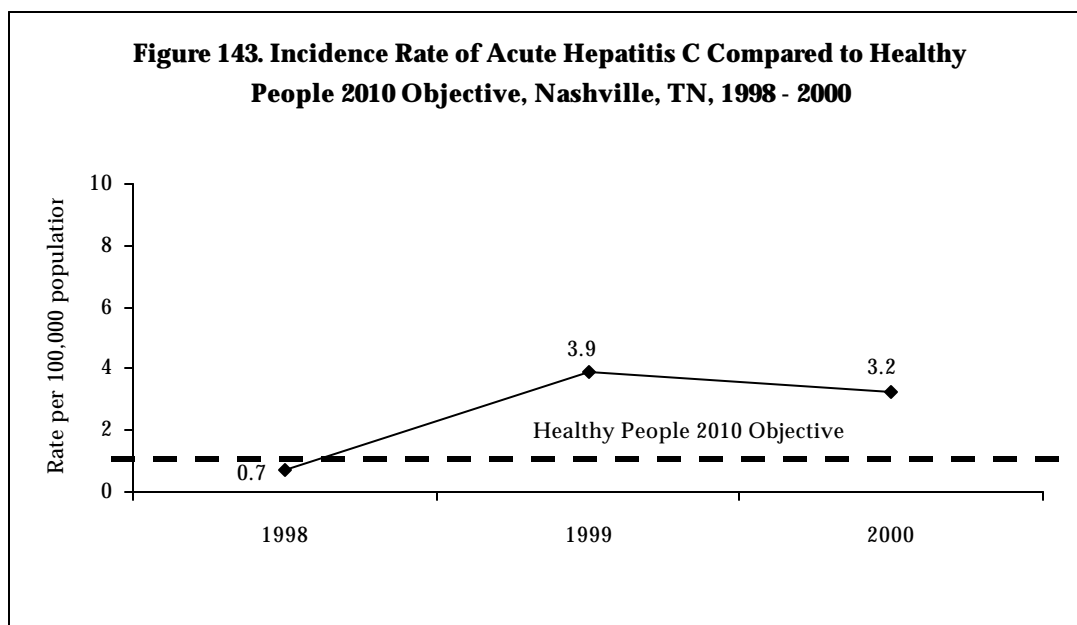
Area	Acute Hepatitis B		Acute Hepatitis C	
	Number	Rate	Number	Rate
<b>Nashville</b>	38	6.7	18	3.2
<b>Memphis</b>	85	9.5	1	0.1
<b>Knoxville</b>	14	3.7	1	0.3
<b>Chattanooga</b>	16	5.2	28	9.1
<b>Tennessee</b>	220	3.9	105	1.8
<b>U.S.</b>	6,646	2.4	2,895	1.0

\*U.S. data provisional taken from MMWR, January 5, 2001/Vol.49/Nos.51&52. Rate calculated using 2000 census population.

Healthy People 2010 Objective 14-1 addresses hepatitis B in persons 2 to 18 years of age. Cases in Nashville within this age range decreased from two cases in 1998 to 0 cases in 2000. Objective 14-3 pertains to hepatitis B as it affects specific age groups and persons with specific risk factors. With the exception of the adult 40+ age group in 1999, Nashville's numbers have exceeded the objective consistently during the three-year period. For the 25 to 39 year age group, Nashville's rate per 100,000 population was more than double the objective rate in 1998 and 2000. Transmission of HBV can occur

by sharing of needles by injecting drug users. Anal intercourse is also associated with an increased risk of infection. Nosocomial transmission may occur by several methods including transfusion and hemodialysis, but also through needlesticks and other sharp instrument injuries to medical personnel.<sup>1</sup>

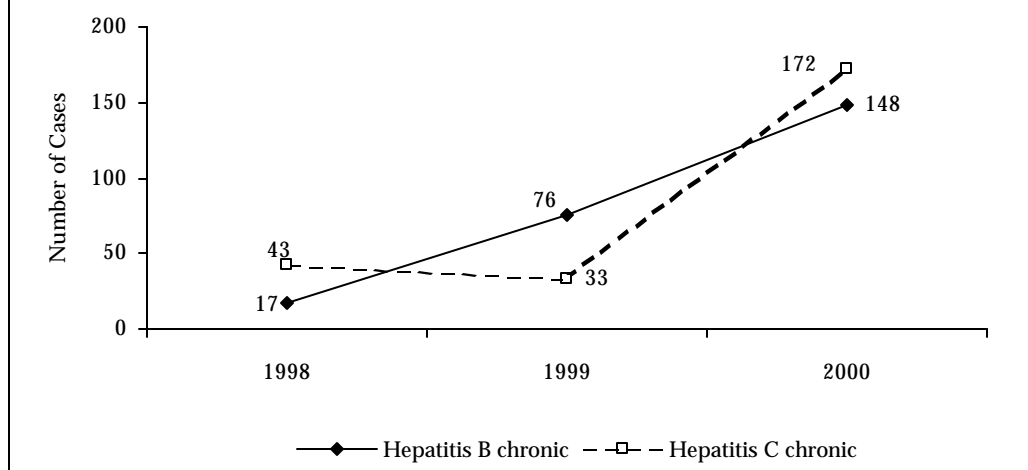
HCV was discovered by molecular cloning in 1988. The disease is transmitted primarily by blood transfusion or injecting drug use. HCV infections acquired 15 or more years ago were acquired primarily as a result of a blood transfusion. However, CDC data shows that transfusion rarely accounts for recently acquired infections. In contrast, injecting drug use currently accounts for 60% of HCV transmission in the U.S.<sup>2</sup> In 1999 and 2000, Nashville's incidence rate for hepatitis C was more than 3 times the Healthy People 2010 Objective 14-9 (Figure 143).



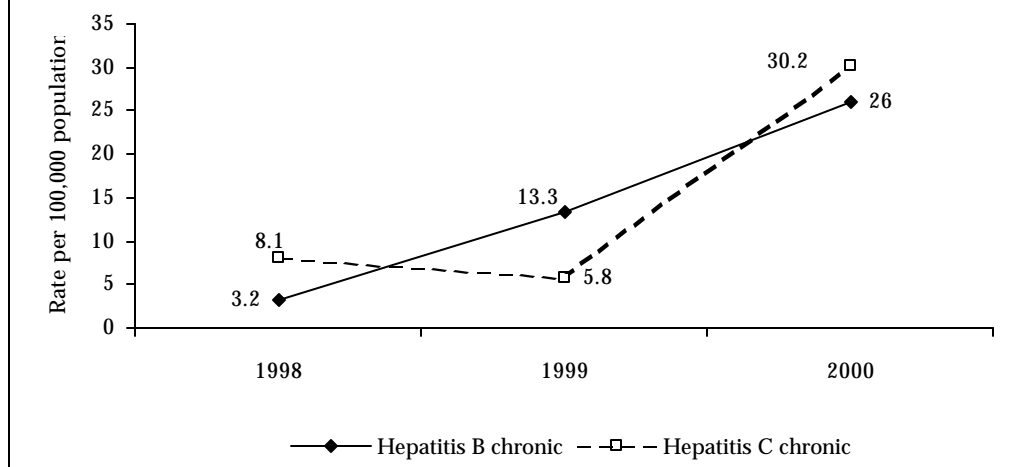
### Discussion

Although chronic hepatitis B and C infections are not reportable to the Health Department, some data is available pertaining to these diseases. As part of the investigation process carried out by the staff of the MPHD for every case of hepatitis B and C reported as acute, some cases are confirmed to be chronic according to the case definition as described by CDC. [See Glossary for definition.] Although these numbers may not be inclusive of all cases of these diseases in the community, they may give a general perspective of the presence of the diseases in Nashville.

**Figure 144. Number of Cases Chronic Hepatitis B and C, Nashville, TN, 1998 - 2000**



**Figure 145. Incidence Rates for Chronic Hepatitis B and C, Nashville, TN, 1998 - 2000**



Nashville experienced a 421.2% increase in identified chronic hepatitis C cases from 1999 to 2000 and a 94.7% increase in identified chronic hepatitis B cases in the same time period (Figure 144). Utilizing these numbers, Nashville's incidence rate for chronic hepatitis C in 2000 was 30.2 cases per 100,000 population. The incidence rate for chronic Hepatitis B in 2000 was 26 per 100,000 (Figure 145). Healthy People 2010 Developmental Objective 14-10 seeks to increase the proportion of chronic hepatitis C persons identified. Nashville would appear to be achieving this objective.



The CDC funds a Perinatal Hepatitis B Program for intensive case management of hepatitis B positive pregnant women. This program offers education, contact identification, testing, prophylaxis, and strict follow-up of the infants born to these mothers to assure that they receive correct and timely prophylaxis and post-vaccination blood work. The Perinatal Hepatitis B Program in Nashville is managed by the Division of Notifiable Disease Control/Immunization Promotion at MPHD.

References:

1. Chin J. *Control of Communicable Diseases Manual*. 17<sup>th</sup> Edition. Washington, DC: American Public Health Association; 2000.
2. Centers for Disease Control and Prevention. Hepatitis C: what clinicians and other health professionals need to know. Web based training program. 1998. Available at: [http://www.cdc.gov/ncidod/diseases/hepatitis/c\\_training/edu/Info/info.htm](http://www.cdc.gov/ncidod/diseases/hepatitis/c_training/edu/Info/info.htm). Accessed February 25, 2002.

Nashville experienced a 421.2% increase in identified chronic hepatitis C cases from 1999 to 2000 and a 94.7% increase in identified chronic hepatitis B cases in the same time period.

### 3.4.1.5 Vaccine-preventable Notifiable Diseases/Conditions

Vaccine-preventable notifiable diseases/conditions include:

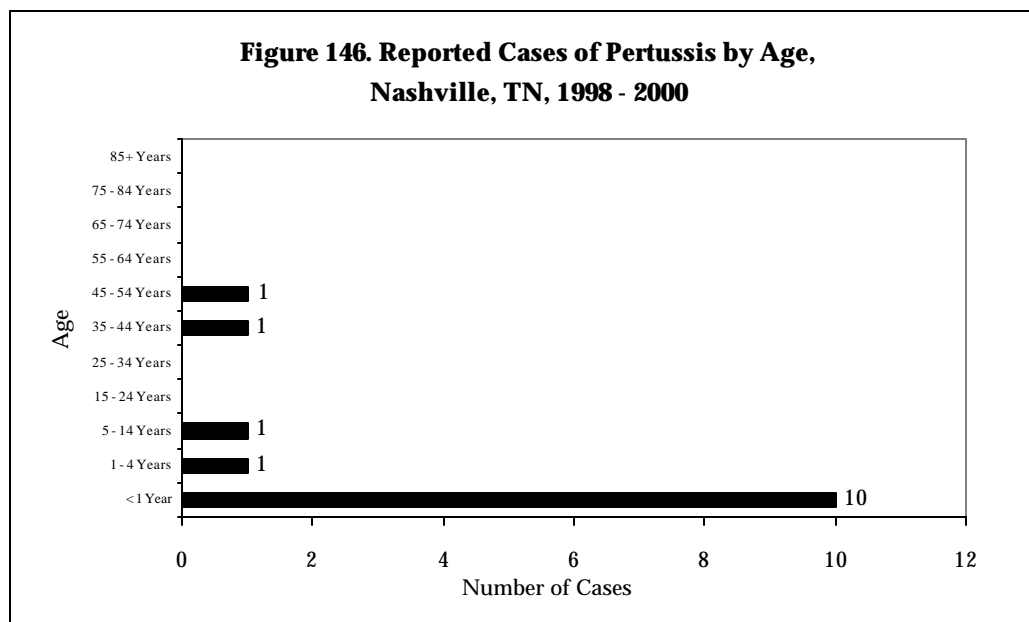
- diphtheria
- measles
- mumps
- pertussis
- poliomyelitis
- rubella
- influenza
- hepatitis A
- hepatitis B
- tetanus
- varicella deaths
- *Haemophilus influenzae* invasive disease

#### Background

The list of notifiable diseases preventable by vaccine includes measles, mumps, rubella, diphtheria, tetanus, poliomyelitis, influenza, hepatitis A, hepatitis B, varicella, *Haemophilus influenzae* type b, pertussis, and pneumococcal disease. Vaccination is an efficient and cost effective means of preventing infection. Vaccines prevent disease thereby eliminating the cost of treating illnesses. Also, vaccination decreases the number of susceptible persons in the community thereby reducing the circulation of infectious organisms and reducing the risk to persons in the community who are not vaccinated.

#### Findings

From 1998 to 2000, there were 14 cases of pertussis reported in Nashville. The incidence of pertussis nationwide has declined since the 1940s when pertussis vaccines were introduced. However, since 1980, the incidence rate has risen. Infants and children experience the highest rates of pertussis, and the rates for these age groups have not risen since 1993. However, nationwide the incidence among adolescents and adults has increased. This may be in part due to the fact that immunity may diminish as children grow into adolescence, and there is no licensed vaccine available for the older person. The increase may also be due in part to improved diagnosis and reporting of cases.<sup>1</sup> In Nashville, 10 of the reported 14 cases occurred in children less than 1 year of age (Figure 146).



Healthy People 2010 Objective 14-1 presents the goals for vaccine-preventable diseases. The 2010 goal for congenital rubella syndrome, diphtheria, *Haemophilus influenzae* in children under 5 years of age, measles, mumps, polio (wild virus type), rubella, and tetanus in persons aged 35 years and older is 0 cases. From 1998 to 2000, Nashville achieved this goal each year for congenital rubella syndrome, diphtheria, measles, polio, rubella, and tetanus. Nashville achieved the goal for mumps in 1999 and 2000. In 1999 and 2000, three of the 11 reported cases of *Haemophilus influenzae* invasive disease were in children under the age of five. Reported cases of pertussis increased from 1998 (2 cases) to 1999 (6 cases) and remained the same for 2000 (6 cases). However, the number of these cases who were under 7 years of age, the Healthy People 2010 Objective 14-1 target age group, increased yearly, from two cases in 1998 to six cases in 2000.

In 2000, Nashville ranked first compared to Memphis, Knoxville, and Chattanooga in number of cases and incidence per 100,000 of pertussis. Nashville's incidence rate of 1.1 was also above the 0.7 rate of Tennessee. Nashville's rate per 100,000 population was equal to or below the U.S. provisional rate for each of the selected diseases (Table 42).

**Table 42. Comparison of Numbers and Incidence Rates for Selected Vaccine-preventable Diseases, Nashville, Memphis, Knoxville, Chattanooga, Tennessee, and U.S.\*, 2000**

Area	Measles		Mumps		Pertussis		Rubella	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
<b>Nashville</b>	0	0.0	0	0.0	6	1.1	0	0.0
<b>Memphis</b>	0	0.0	1	0.1	1	0.1	0	0.0
<b>Knoxville</b>	0	0.0	0	0.0	4	1.0	1	0.3
<b>Chattanooga</b>	0	0.0	0	0.0	0	0.0	0	0.0
<b>Tennessee</b>	0	0.0	2	0.0	41	0.7	1	0.0
<b>U.S.</b>	81	0.0	323	0.1	6,755	2.4	152	0.1

\*U.S. data provisional taken from MMWR, January 5, 2001/Vol.49/Nos.51&52. Rate calculated using 2000 census population.

## Discussion

The Metropolitan Public Health Department provides services to monitor immunization levels in the community, promote immunization awareness, and investigate reports of vaccine-preventable diseases. Daycare and school immunization records are audited for adherence to the vaccine schedule and completion of the appropriate immunization series. Parents of infants born and residing in Davidson County receive notices reminding them of when immunizations are due. Each suspected case of a vaccine-preventable disease is investigated, contacts identified, and appropriate treatment provided.

MPHD offers computerized immunization assessments to public and private physician practices. These assessments pinpoint problem areas in vaccine delivery so that, when necessary, appropriate strategies to improve immunization levels can be developed and implemented.

## Reference:

1. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. Preventing emerging infectious diseases. a strategy for the 21<sup>st</sup> century [online]. 1998. Available at: <http://www.cdc.gov/ncidod/emergplan/planrequest.htm>. Accessed February 13, 2002.

The Metropolitan Public Health Department provides services to monitor immunization levels in the community, promote immunization awareness, and investigate reports of vaccine-preventable diseases.

### 3.4.1.6 Vector-borne Notifiable Diseases/Conditions

#### Background

Vector-borne notifiable diseases/conditions include:

- arboviral encephalitis
- ehrlichiosis
- Lyme disease
- malaria
- Rocky Mountain Spotted Fever

Vector-borne diseases are transmitted to humans and animals by blood-feeding arthropods, such as mosquitoes and ticks. These notifiable diseases include arboviral encephalitis, ehrlichiosis, Lyme disease, malaria, and Rocky Mountain Spotted Fever. Lyme disease accounts for 95% of all vector-borne diseases in the U.S. More than 145,000 cases have been reported to the CDC since nationwide surveillance began in 1982. The overall incidence rate in the U.S. is about 5 per 100,000 population, but Lyme disease is considered to be underreported.<sup>1</sup> The cost for treatment of Lyme disease is significant. Lyme disease diagnosed and treated in the early stages has a cost estimated at \$74 in direct medical costs. However, if diagnosis and treatment are delayed, complications such as meningitis, heart abnormalities, and chronic arthritis may develop. Treatment of these complications of Lyme disease may result in costs from \$2,228 to \$6,724 per patient in the first year alone.<sup>2</sup>

#### Findings

As is the case nationwide, Lyme disease was the most frequently reported vector-borne disease in Nashville. Ehrlichiosis and Rocky Mountain Spotted Fever, also tick-borne diseases, were the second and third most frequently reported vector-borne diseases from 1998 to 2000. Six cases of malaria, a mosquito-borne disease, were also reported in Nashville over the three-year period. No cases of arboviral encephalitis were reported in Nashville during this period. Arboviruses are transmitted when infected mosquitoes bite and infect susceptible humans. Once in the bloodstream, the viruses multiply and can cause inflammation of the brain, encephalitis. West Nile encephalitis became a concern in 1999, when 62 cases of the disease and 7 deaths occurred in the New York area. Prior to this time, West Nile virus was found only in Africa, Eastern Europe, West Asia, and the Middle East.<sup>3</sup>

The Healthy People 2010 Objective 14-8 pertains to the reduction of Lyme disease in the areas of the country where the disease is endemic. Nashville's incidence per 100,000 population fell from 1.2 in 1999 to 0.5 in 2000. Please see the Appendix for more information pertaining to Healthy People 2010 objectives.

Comparison of vector-borne diseases between Nashville and the other three largest metropolitan areas is seen in Table 43. In 2000, Nashville ranked first in incidence of ehrlichiosis and malaria. Memphis ranked first for Rocky Mountain Spotted Fever; Chattanooga ranked first for Lyme disease; and Knoxville, with 7 cases of California encephalitis, ranked first for arboviral encephalitis. Nashville's rate for malaria, 0.7, was higher than the Tennessee rate of 0.2. Provisional U.S. 2000 data was available only for Lyme Disease and malaria. Nashville ranked above the U.S. provisional incidence rate for malaria.

**Table 43. Comparison of Numbers and Incidence Rates of Selected Vector-borne Diseases, Nashville, Memphis, Knoxville, Chattanooga, Tennessee, and U.S.\*, 2000**

Area	Ehrlichiosis		Lyme Disease		Rocky Mountain Spotted Fever		Malaria		Arboviral encephalitis-California	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Nashville	4	0.7	3	0.5	2	0.4	4	0.7	0	0.0
Memphis	0	0.0	1	0.1	5	0.6	3	0.3	2	0.2
Knoxville	1	0.3	1	0.3	2	0.5	1	0.3	7	1.8
Chattanooga	0	0.0	3	1.0	1	0.3	0	0.0	0	0.0
Tennessee	46	0.8	28	0.5	56	1.0	13	0.2	19	0.3
U.S.	NA**		13,309	4.7	NA		1,288	0.5	NA	

\*U.S. data provisional taken from MMWR, January 5, 2001/Vol.49/Nos.51&52. Rate calculated using 2000 census population.

\*\*Not available

### Discussion

Ninety percent of reported Lyme disease in the past decade occurred in ten states in the northeast and upper Midwest U.S. Lyme disease is transmitted through the bite of ticks infected with *Borrelia burgdorferi*, primarily *Ixodes scapularis*. In about 90% of people infected with Lyme disease, the first manifestation is a red, expanding “bull’s-eye” rash, erythema migrans.<sup>4</sup> A rash similar to erythema migrans has been identified in persons living in the southeastern and south-central states following the bite of the lone star tick, *Amblyomma americanum*. This Lyme disease-like rash has been named Southern tick-associated rash illness (STARI). Skin biopsies taken from these patients do not grow *Borrelia burgdorferi*. Patients experience mild constitutional symptoms, and recover uneventfully.<sup>5</sup> The CDC is obtaining samples from patients suspected of having STARI under an Institutional Review Board-approved investigational protocol.

### References:

- Centers for Disease Control and Prevention. Division of Vector-borne Infectious Diseases. Epidemiology of lyme disease [online]. 2001. Available at: <http://www.cdc.gov/ncidod/dvbid/lyme/epi.htm>. Accessed March 7, 2002.
- U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. Preventing emerging infectious diseases. a strategy for the 21<sup>st</sup> century [online]. 1998. Available at: <http://www.cdc.gov/ncidod/emergplan/planrequest.htm>. Accessed February 13, 2002.
- Centers for Disease Control and Prevention. Division of Vector-borne Infectious Diseases. Questions and answers about the west Nile virus [online]. 2001. Available at: <http://www.cdc.gov/ncidod/dvbid/westnile/q&a.htm>. Accessed March 7, 2002.
- Chin, J. *Control of Communicable Diseases Manual*. 17<sup>th</sup> Edition. Washington, DC: American Public Health Association; 2000.
- Craig A. “Lyme-like disease in Tennessee.” *Public Health Watch*. Vol5No3. Nashville, TN: Metropolitan Public Health Department; 2001.

### 3.4.1.7 Notifiable Diseases/Conditions as Possible Bioterrorism Threats

The diseases/conditions most often associated with bioterrorism include:

- anthrax
- plague
- Venezuelan Equine Encephalitis
- smallpox
- botulism
- Q fever
- Staph enterotoxin B pulmonary poisoning
- Viral Hemorrhagic Fever
- brucellosis
- Ricin poisoning
- tularemia

#### Background

The diseases most often associated with bioterrorism include anthrax, plague, Venezuelan Equine Encephalitis, smallpox, botulism, Q Fever, Staph enterotoxin B pulmonary poisoning, Viral Hemorrhagic Fever, brucellosis, Ricin poisoning, and tularemia. Although these diseases/conditions are most often mentioned as bioterrorism threats, a biological agent does not have to be genetically engineered to be resistant to all known vaccines/drugs or highly contagious in order to be an effective terrorist weapon. In 1984 in The Dalles, Oregon, members of a religious commune successfully carried out a terrorist act using a common salmonella strain that was not lethal or contagious and was responsive to antibiotics. Over 700 people in the community were infected as a result of the deliberate contamination of salad bars in at least 10 restaurants with salmonella typhimurium.<sup>1</sup>

#### Findings

No confirmed cases of notifiable diseases/conditions most often associated with bioterrorism were reported in Nashville from 1998 to 2000. Metropolitan Public Health Department has been involved in planning for a bioterrorist event since 1999. The plan was submitted to the Federal Government in September, 2000. Measures for active surveillance continue to be enhanced and training of MPH staff continues in order to successfully facilitate mobilization in the event of a bioterrorist act in Nashville.<sup>2</sup>

#### Discussion

Biological terrorism may not be immediately obvious. A small outbreak of illness could be an early warning of a more serious attack. Indications of biological terrorism could include more visits to physician offices, increased visits to emergency rooms, increased hospital admissions, increased antibiotic prescriptions filled by pharmacists, or increased calls to 911. To address the insidious threat of biological terrorism will require the combined efforts of all members of the community. The Metropolitan Public Health Department has developed a 911 syndrome surveillance system to observe for unusual or increased calls pertaining to specific symptoms. A daily monitoring system for certain notifiable diseases has also been established to look for sudden increases or changes in the trends of certain notifiable diseases.

#### References:

1. Torok TJ, Tauxe RV, Wise RP, Livengood JR, Sokolow R, Mauvais S, Birkness KA, Skeels MR, Horan JM, Foster LR. A large community outbreak of salmonellosis caused by intentional contamination of restaurant salad bars. *JAMA*. 1997; Aug 6;278 (5):389-95.
2. Trotter P. Bioterrorism: the role of the Metropolitan Health Department. *Public Health Watch*. Vol5No1. Nashville, Tennessee: Metropolitan Public Health Department; 2001.

## Related Indicators

Vaccine-preventable  
notifiable diseases/  
conditions

### 3.4.2 Adult Influenza and Pneumococcal Vaccinations

#### Background

The national Advisory Committee for Immunization Practices (ACIP) recommends adults aged 50 and older, especially those aged 65 and older and individuals aged 6 months and older with certain chronic medical conditions, receive the influenza vaccine annually<sup>1</sup>. ACIP also recommends adults aged 65 and older and individuals with certain chronic medical conditions receive a one-time dose of pneumococcal polysaccharide vaccine (PPV)<sup>2</sup>. The U.S. Department of Health and Human Services has set national 'Healthy People' targets for influenza and PPV vaccination. The Healthy People targets calls for 80% of adults aged 65 and older to receive annual influenza vaccination and a one-time dose of PPV by year 2000, and 90% of adults aged 65 and older to be vaccinated by 2010 (Objective 14-29).<sup>3</sup>

On average, influenza alone is responsible for 20,000 deaths and 110,000 hospitalizations every year in the U.S. During severe flu seasons, influenza may account for as many as 40,000 deaths and 300,000 hospitalizations nationally. Annual influenza vaccination can prevent illness in between 70% and 90% of vaccinated healthy adults <65 years old.<sup>1</sup> More importantly, although the vaccine is not as effective at preventing illness among the elderly and among individuals with chronic medical conditions, the vaccine is very effective in preventing more serious secondary complications such as pneumonia, which can result in hospitalization and/or death.

## Additional Data

Appendices  
pages D-73 - D-75

Each year, pneumococcal disease results in 500,000 cases of pneumonia, 50,000 cases of bacteremia, 3,000 cases of meningitis and as many as 40,000 deaths. It is estimated that 50% of these deaths can be prevented with the use of PPV which is considered safe and effective at reducing invasive pneumococcal disease among adults aged 65 and older and those under 65 with certain medical conditions.<sup>2</sup>

There are two data sources from which we can obtain estimates for adult vaccination coverage in Nashville: the 1998 adult Behavioral Risk Factor Surveillance Survey (BRFSS) and year 2000 Medicare billing records. Since these data only provide rough estimates of vaccination rates, it is important to remember what we report may be underestimates or overestimates of the true adult vaccination rates in Nashville. Nonetheless, Medicare billing data and BRFSS estimates can still provide a general overview of the status of adult vaccination in Nashville.

#### Findings

##### 1998 BRFSS

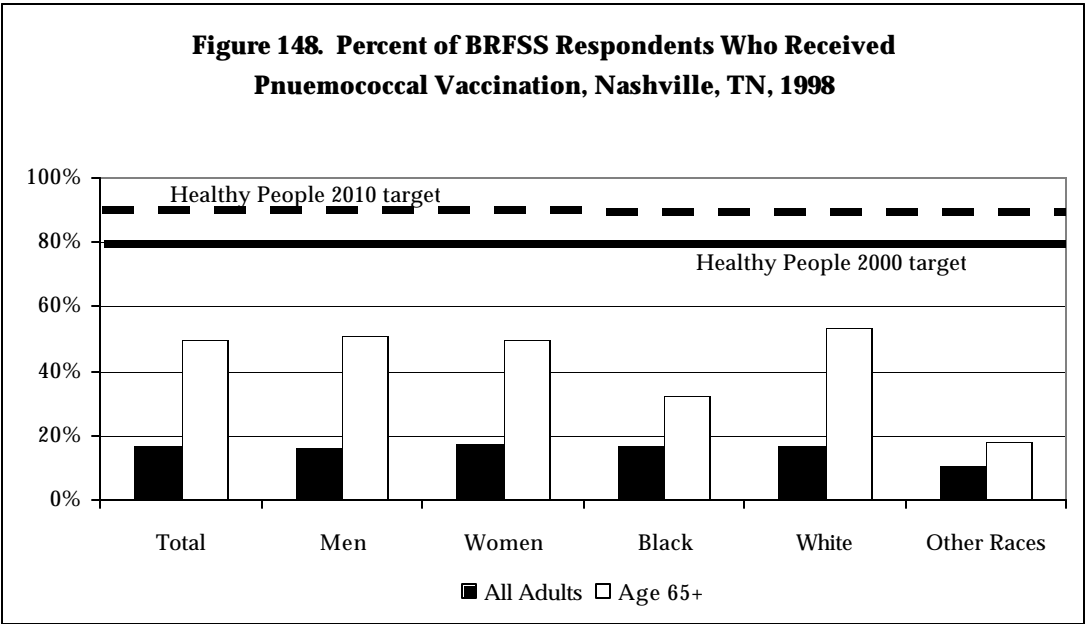
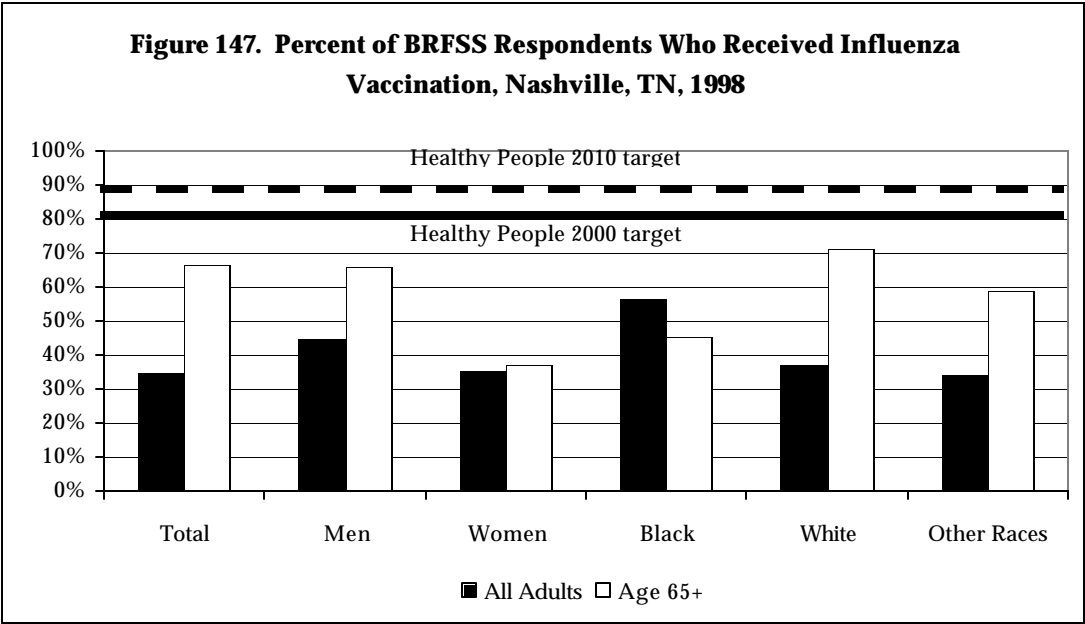
The most recent BRFSS data available for Nashville is from 1998. In 1998, BRFSS respondents were asked two questions related to immunization: "During the past 12 months, have you had a flu shot" and "Have you ever had a pneumonia vaccination?" Of all the respondents, only 35% reported receiving the influenza vaccine (Figure 147). Among respondents aged 65 and older, the percentage reporting influenza vaccination was 67%. Based on the BRFSS results, there appears to be a disparity in influenza vaccination rates between men and women. Sixty-six percent (66%) of men aged 65 and older reported receiving the influenza vaccine in 1998, but only 37% of women did. A racial disparity is also evident, with a smaller proportion of blacks reporting vaccination than whites (45% compared to 71% among respondents aged 65 and older). Pneumococcal vaccination rates were lower than influenza vaccination rates.

## Data Sources

- Metro Public Health Department: BRFSS
- Medicare

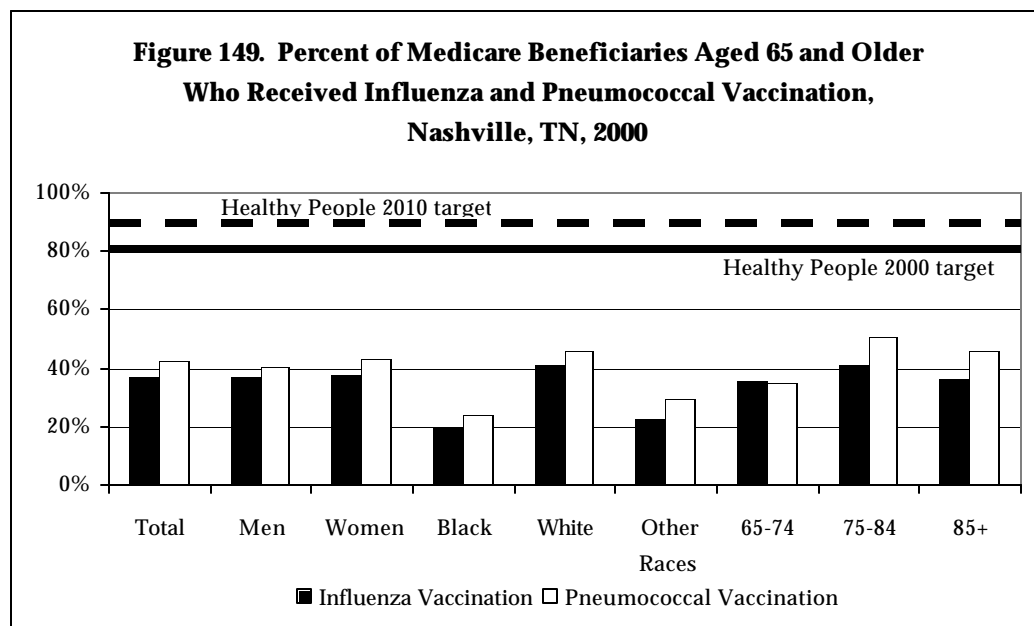


Only 50% of respondents aged 65 and older reported receiving a pneumonia vaccination (PPV) (Figure 148). There was no difference in the pneumococcal vaccination rate between men and women, however racial differences were again apparent. Fifty-four percent (54%) of white respondents, but only 32% of blacks aged 65 and older reported receiving the PPV vaccine by 1998.



### 2000 Medicare

The Center for Medicare and Medicaid Services (CMS) collects information on influenza and pneumococcal vaccination of Medicare beneficiaries from billing records. This data shows that, similar to the BRFSS results, blacks have a lower vaccination rate than whites (Figure 149). In 2000, white Medicare beneficiaries aged 65 and older had influenza and pneumococcal vaccination rates that were nearly double the rates among blacks. Older age groups tended to have higher vaccination rates than younger age groups (Figure 148). Unlike the BRFSS data, there was no gender disparity apparent in the Medicare billing data (Figure 148). When the Medicare data were examined by zip code regions, we found that the zip codes with the largest black populations tended to have the lowest vaccination rates, but that blacks living in zip codes with large white populations tended to have higher vaccination rates than other blacks. The same was true for whites living in predominately black areas – their vaccination rates were lower and coincided with the majority (blacks). (See Maps 1 - 4.)

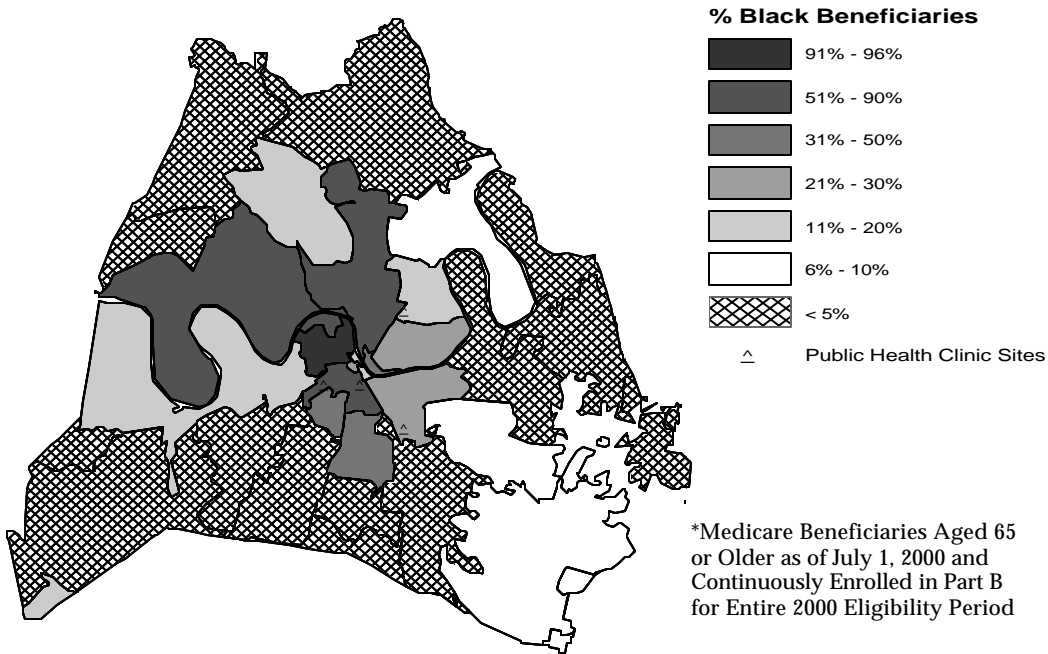


Over time, vaccination rates are expected to increase due to improved delivery systems and increased community knowledge about the benefits of these vaccines.

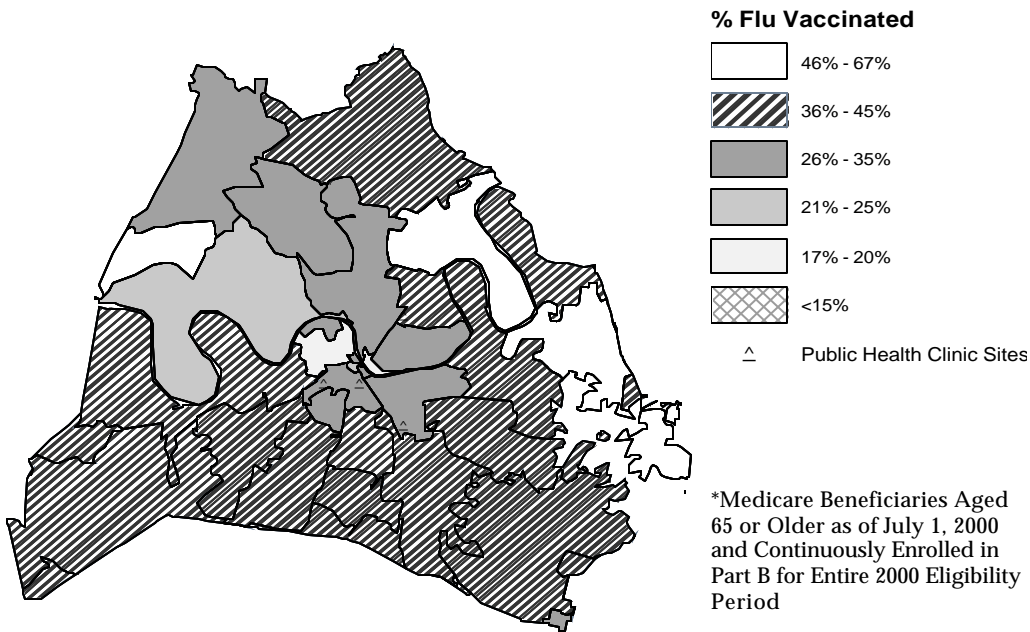
Pneumococcal vaccination rates increased three percentage points from 1999 to 2000 and there is hope that this trend will continue (Table 44). Influenza vaccination rates declined in 2000 compared to 1999, likely resulting from the delay in the availability of the influenza vaccine in 2000<sup>4</sup>.

Among respondents aged 65 and older, the percentage reporting influenza vaccination was 67%. Only 50% of respondents aged 65 and older reported receiving a pneumonia vaccination.

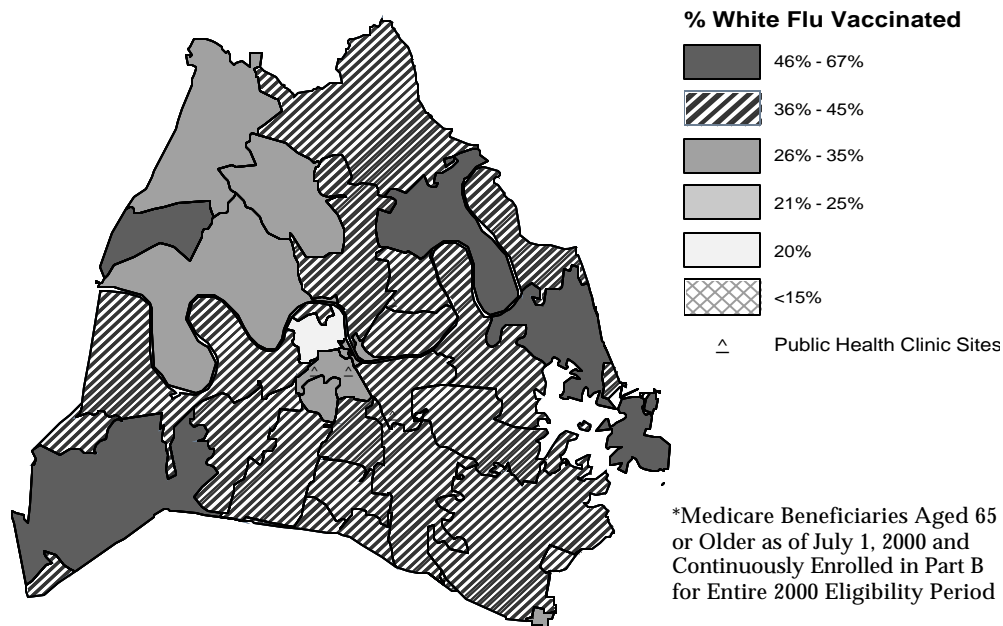
**Map 1. Percentage of Black Medicare Beneficiaries Aged 65 and Older by Zip Code, Nashville, TN, 2000**



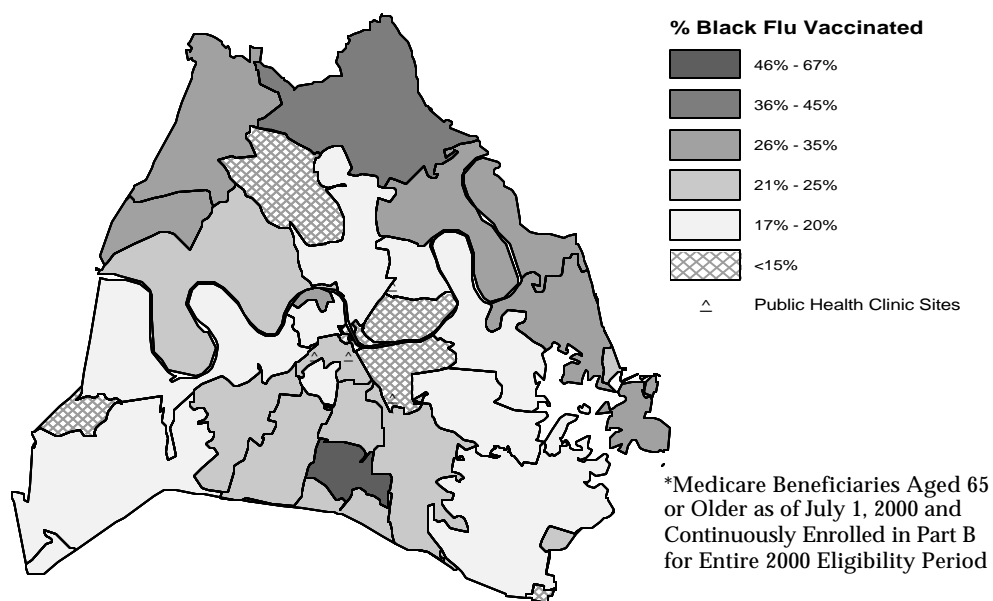
**Map 2. Percentage of Medicare Beneficiaries Aged 65 and Older Who Received Influenza Vaccine, Nashville, TN, 2000**



**Map 3. Percentage of White Medicare Beneficiaries Aged 65 and Older Who Received Influenza Vaccine by Zip Code, Nashville, TN, 2000**



**Map 4. Percentage of Black Medicare Beneficiaries Aged 65 and Older Who Received Influenza Vaccine by Zip Code, Nashville, TN, 2000**



**Table 44. Percent of Medicare Beneficiaries Aged 65 and Older Who Received Influenza and Pneumococcal Vaccinations, Nashville, 1999-2000, Tennessee and U.S., 2000\***

Vaccination	Nashville 1999	Nashville 2000	Tennessee 2000	U.S. 2000
<b>Influenza</b>	47%	37%	42%	37%
<b>Pneumococcal</b>	40%	43%	41%	37%

\* Data collected by the Center for Medicare and Medicaid Services (CMS) and supplied by the Tennessee Peer Review Organization (PRO), the Center for Healthcare Quality

### ***Comparing Nashville to Tennessee and the U.S.***

The Nashville self-reported immunization rates for adults age 65 and older were very similar to those from the Tennessee BRFSS and the composite U.S. BRFSS data (Table 45). For influenza, there was essentially no difference from the local to state level or the local to national level. For pneumococcal vaccination, the Nashville rate was about five percentage points below the national average and the Tennessee rate.

**Table 45. Percent of BRFSS Respondents Aged 65 and Older Who Received Influenza and Pneumococcal Vaccinations, Nashville, 1998, Tennessee and U.S., 1999**

Vaccination	Nashville 1998	Tennessee 1999	U.S. 1999*
<b>Influenza</b>	67%	66%	67%
<b>Pneumococcal</b>	50%	54%	55%

\*U.S. data reflects the median percent from the 50 states, District of Columbia, and Puerto Rico

The Medicare billing data show that the influenza vaccination rate in Nashville is slightly lower than the Tennessee rate, but is similar to the rate for the U.S. (Table 44). Unlike the results from the BRFSS, Medicare data show that the pneumococcal vaccination rate in Nashville is higher than the rate for Tennessee and the U.S.

### **Discussion**

According to the available data sources, Nashville had not met the Healthy People goal for influenza and pneumococcal vaccination of 80% among adults aged 65 and older by year 2000. A great deal of effort is needed in Nashville to achieve the Healthy People 2010 goal for influenza and pneumococcal vaccination of 90% for adults aged 65 and older. The vaccines for both influenza and pneumococcal disease are covered by Medicare Part B, thus removing cost as a barrier for most residents aged 65 and older. To further expand access to these vaccinations, each year in the late fall, MPH D offers a vaccination clinic to provide Nashville residents with free influenza and pneumococcal vaccines. MPH D has also partnered with pharmacists in those areas of the city with the lowest vaccination rates to make pneumococcal vaccines more readily available to the community.

## References:

1. Centers for Disease Control and Prevention. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices. *Morbidity and Mortality Weekly Report*. 2002; 51(RR-3): 1-31.
2. Centers for Disease Control and Prevention. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices. *Morbidity and Mortality Weekly Report*. 1997; 46(RR-8): 1-24.
3. U.S. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2<sup>nd</sup> ed. Washington, DC: U.S. Government Printing Office; November 2000.
4. Centers for Disease Control and Prevention. Delayed supply of influenza vaccine and adjunct ACIP influenza vaccine recommendations for the 2000—01 influenza season [Notice to readers]. *Morbidity and Mortality Weekly Report*. 2000; 49(27): 619-622.

According to the available data sources, Nashville had not met the Healthy People goal for influenza and pneumococcal vaccination of 80% among adults aged 65 and older by year 2000.

## Related Indicators

- Sexual behavior
- Substance abuse and illicit drug use
- Poverty level
- Lack of health insurance

## Additional Data

Appendices  
pages D-76 - D-81

## Data Sources

- Metro Public Health Department
- Tennessee Department of Health

### 3.4.3 Sexually Transmitted Diseases

Sexually transmitted diseases (STDs) are communicable diseases spread primarily by sexual activity. Despite the preventable and often treatable nature of STDs, they continue to be a significant public health problem in Nashville and across the country. Rates of specific STDs are calculated by dividing the total number of cases by the population at risk.

The rates of various STDs in a community are important community health indicators because they are associated with a variety of factors, including poverty, substance abuse, access to health care, and responsible sexual behaviors. If left undiagnosed and untreated, these illnesses can have serious long-term health consequences, such as infertility, fetal and infant health problems, cancer, and death. In addition, certain STDs can place individuals at greater risk of contracting HIV once exposed.

To address the threat of STDs in Nashville, MPHD has a number of programs in place designed to identify, treat, educate, and prevent transmission of STDs. MPHD conducts disease surveillance and reporting. This allows tracking of STD trends over time and in various populations, and helps to target resources to those populations most at risk. The STD clinic at Lentz Public Health Center provides testing and treatment for STDs such as syphilis, gonorrhea, chlamydia and trichomoniasis. Confidential HIV testing is also provided. Health workers at MPHD provide counseling and education about STDs, how they are transmitted and how to prevent infection, both to clients in the clinic setting, and in the community. When an individual is positive for an STD, MPHD provides partner notification and treatment. This service is important because it can prevent and treat illness in individuals who are carrying, or may have been exposed to STDs, but who have not yet been diagnosed. It also plays a crucial role in interrupting and preventing further disease transmission in the community<sup>1</sup>.

The information provided here refers to diseases that are reportable by law to MPHD. These diseases include chlamydia, gonorrhea, syphilis, HIV and AIDS. Among the other STDs that have an impact on the overall health of our community but are not reportable by law are herpes, genital warts (HPV), and trichomoniasis. In addition, reported rates are most likely an underestimate of the true rate of disease in the community because infected individuals may fail to seek diagnosis and treatment for their illness, and physicians may neglect to report all STD cases to the health department. This makes STD rates sensitive to improvements (and declines) in the quality of public health surveillance activities.

## Reference:

1. Rogers B, Huang J, Horner N, Perkey B. *Sexually Transmitted Diseases in the 1990's in Davidson County, Tennessee*. Nashville, TN: Metropolitan Public Health Department of Nashville and Davidson County, Division of Epidemiology; October, 2000.

MPHD has a number of programs in place designed to identify, treat, educate, and prevent transmission of STDs.

### 3.4.3.1 Chlamydia

#### Background

*Chlamydia trachomatis* is a bacterial infection, primarily spread by sexual activity. Chlamydia is easily treatable with antibiotics; however, infected individuals often do not know they have chlamydia because the majority of cases (75% in women; 50% in men) are asymptomatic (without symptoms).<sup>1</sup> In women, if left untreated, chlamydia may lead to Pelvic Inflammatory Disease (PID), an important cause of infertility, chronic pelvic pain, and ectopic pregnancies.

In Nashville, there were 2,403 cases of chlamydia reported to the MPHD in 2000.

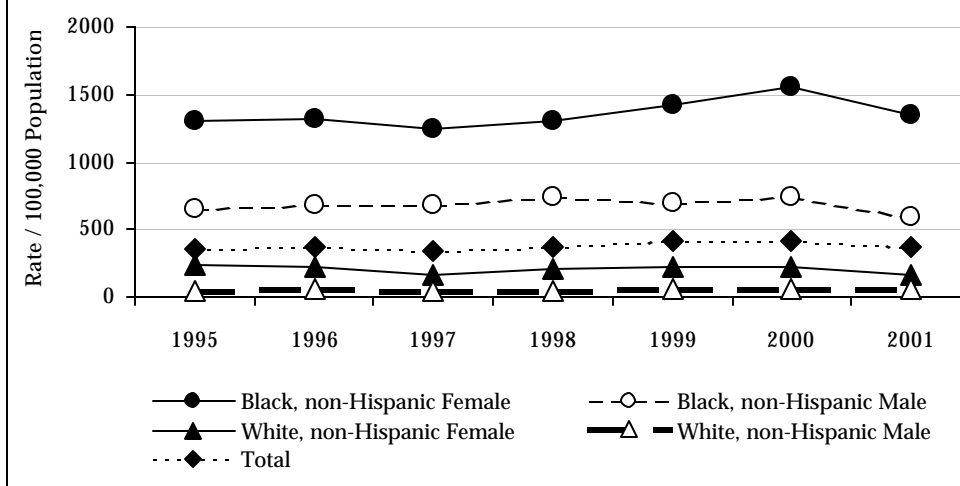
The Centers for Disease Control and Prevention (CDC) recommends annual screening for all women, age 20 and younger, and also for women over 20 with risk factors for infection such as new or multiple sex partners, or lack of barrier contraception. In addition, all women with cervical infections and all pregnant women should be tested.<sup>2</sup> The national Healthy People 2010 goal (25-1) towards reducing chlamydia morbidity is to reduce the proportion of adolescents and young adults, attending family planning and STD clinics that are infected with chlamydia to 3.0%.<sup>3</sup>

In Nashville, we do not have a good measure of the number of young adults attending family planning and STD clinics. Therefore, in this report, the rate of chlamydia overall, and among the target age group (15-24 year olds) are calculated from disease surveillance data for all areas (local, state and national). These rates differ from the national Healthy People measure because they include in the denominator individuals from the general population who are presumably at lower risk of infection than those who would visit a STD or family planning clinic. Because of this, we would expect rates of disease based on surveillance data to be much lower in comparison to rates calculated from data collected at STD and family planning clinics.

#### Findings

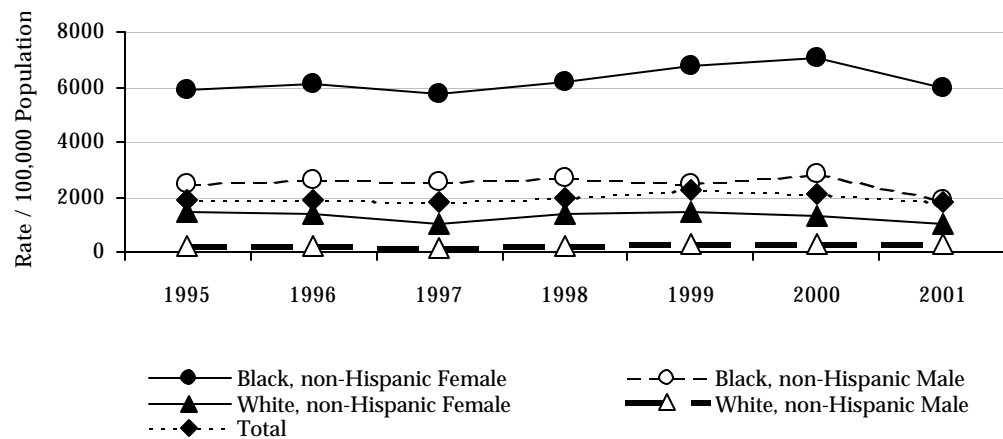
In Nashville, there were 2,403 cases of chlamydia reported to the MPHD in 2000. Rates of chlamydia have been increasing in Nashville since the early 1990's.<sup>4</sup> Between 1995

**Figure 150. Chlamydia Rates by Race and Gender, Nashville, TN, 1995 - 2001**





**Figure 151. Chlamydia Rates among Young Adults Aged 15-24 by Race and Gender, Nashville, TN, 1995 - 2001**



Nationally, chlamydia is the most commonly reported notifiable disease, with a rate of 258 per 100,000 population in 2000.

**Table 46. Chlamydia Rates by Subgroup, Nashville, TN, 2000**

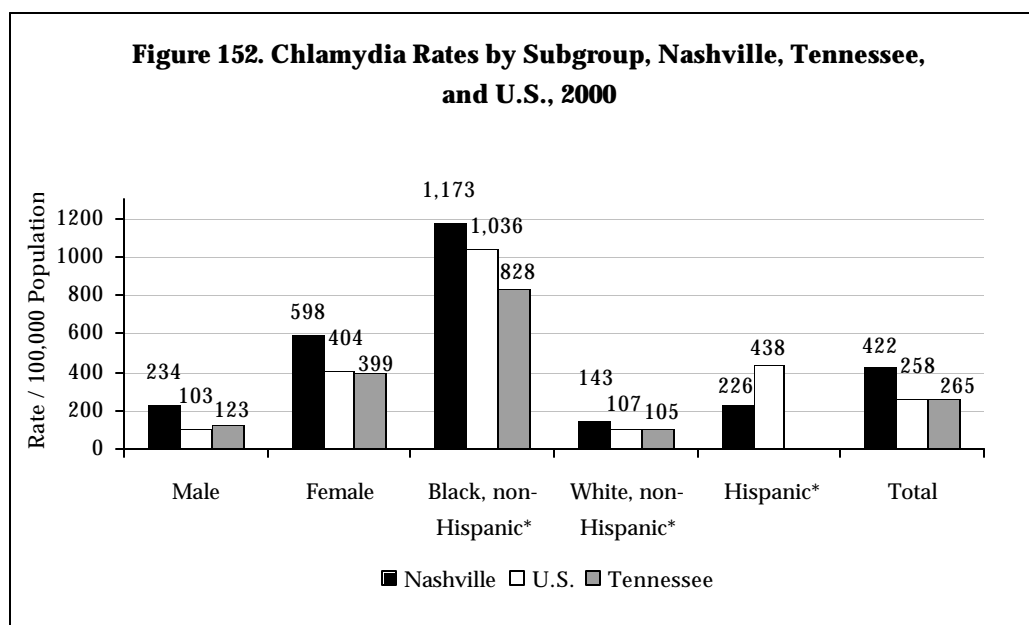
	Chlamydia Rate/100,000 Population		
	Both Genders	Males	Females
<b>TOTAL</b>	422	234	598
<b>RACE</b>			
<b>Black or African American</b>	1,181	744	1,561
<b>White</b>	146	61	226
<b>Other</b>	99	67	139
<i>Asian or Pacific Islander</i>	73	ψ	ψ
<i>American Indian or Alaska Native</i>	ψ	ψ	ψ
<b>ETHNICITY</b>			
<b>Hispanic or Latino</b>	226	94	433
<b>Not Hispanic or Latino</b>	421	240	586
<i>Black or African American</i>	1,173	735	1,553
<i>White</i>	143	63	218
<i>Other</i>	168	83	277
<b>AGE</b>			
<b>15-24</b>	2,127	988	3,257
<i>Black or African American</i>	5,120	2,860	7,080
<i>White</i>	808	250	1,364
<i>Other</i>	253	122	440
<i>Hispanic or Latino</i>	602	205	1,372
<i>Not Hispanic or Latino</i>	2,206	1,074	3,268
<i>Black or African American</i>	5,095	2,821	7,067
<i>White</i>	811	267	1,338
<i>Other</i>	499	197	950
<b>25-34</b>	409	329	493
<b>35-44</b>	91	80	102

ψ Data are statistically unreliable.

and 2000, the rate of chlamydia in Nashville rose from 361 per 100,000 population in 1995 to 422 in 2000 (Figure 150). Among 15-24 year olds, the chlamydia rate rose from 1,866 in 1995, to 2,127 in 2000 (Figure 151). It is likely that these increases were due in part to increased screening and improved diagnostic testing, however, these factors probably do not account for all of the increases. Rates among women (598) were much higher than among men (234), most likely due to the asymptomatic nature of the infection and because women are screened more frequently. When examined by race, rates for whites remained low and relatively constant or decreased, while rates among blacks increased. Black females, aged 15-24, had the highest rate of chlamydia (7,080), whereas white females aged 15-24 had a rate of only 1,364 (Table 46). Preliminary data from 2001 suggests that chlamydia rates are finally on the decrease (Figures 150 and 151).

### ***Comparing Nashville to Tennessee and the U.S.***

Nationally, chlamydia is the most commonly reported notifiable disease, with a rate of 258 per 100,000 population in 2000<sup>5</sup>. This is a large increase from 190 in 1995<sup>6</sup>. In 2000, Tennessee ranked 18<sup>th</sup> in the nation for reported cases of chlamydia<sup>6</sup>, with a rate of 265, up from 251 in 1995. Rates of disease in Nashville are higher than Tennessee or U.S. rates, however, Nashville is an urban center and rates are expected to be higher. Chlamydia rates are much higher among women than among men. In year 2000, rates among U.S. women (404) were approximately four times that of U.S. men (103)<sup>5</sup>. In Tennessee, the disparity between women (399) and men (123) was similar, however, the gender disparity in Nashville is much less pronounced. This could be an indication that Nashville is doing a good job of testing males for chlamydia, or that Nashville needs to improve screening efforts for women. There is also a large race disparity seen with chlamydia. U.S. blacks have a chlamydia rate ten times that of whites<sup>5</sup>. In Tennessee, and in Nashville, the racial disparity is large, although less pronounced



\*Ethnicity information was not available for Tennessee, therefore, rates by race for Tennessee are reported without taking ethnicity into account.

It is clear that chlamydia continues to be a serious health problem in Nashville.

than the U.S. overall, with blacks having a rate approximately 8 times higher than whites. Chlamydia rates among Hispanics fell in between the rates for blacks and whites, with a rate 50% higher than whites in Nashville, and more than four times higher than whites in the U.S. overall (Figure 152).

### Discussion

Since 1993, the federal government has provided funding for STD-related infertility prevention, with chlamydia screening and testing as a cornerstone of the project. In regions where screening has been fully implemented, great success has been demonstrated<sup>7</sup>. In addition, extremely accurate urine tests have been recently developed which will make chlamydia screening for men more convenient and less painful. As a result, reported rates in men may soon more closely mirror those among women<sup>8</sup>.

It is clear that chlamydia continues to be a serious health problem in Nashville. The lower reported rates of chlamydia among men compared to those among women suggest that many of the partners of infected women are not being screened or seeking treatment and are a continued transmission risk. With increased screening and the utilization of more user-friendly and accurate tests in the clinic setting, additional cases will be found and treated. Targeted screening for those most at risk (young black women aged 15-24) may further impact rates of disease.

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5. Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance, 2000*. Atlanta, GA: U.S. Department of Health and Human Services. September; 2001.
6. Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance, 1999*. Atlanta, GA: U.S. Department of Health and Human Services. September; 2000.
7. Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. *NEJM*. 1996; 34(21):1362-66.
8. Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2000 Supplement, Chlamydia Prevalence Monitoring Project*. Atlanta, GA: U.S. Department of Health and Human Services; November, 2001.

### 3.4.3.2 Gonorrhea

#### Background

In Nashville in 2000, there were 2,404 cases of gonorrhea reported to the MPHD.

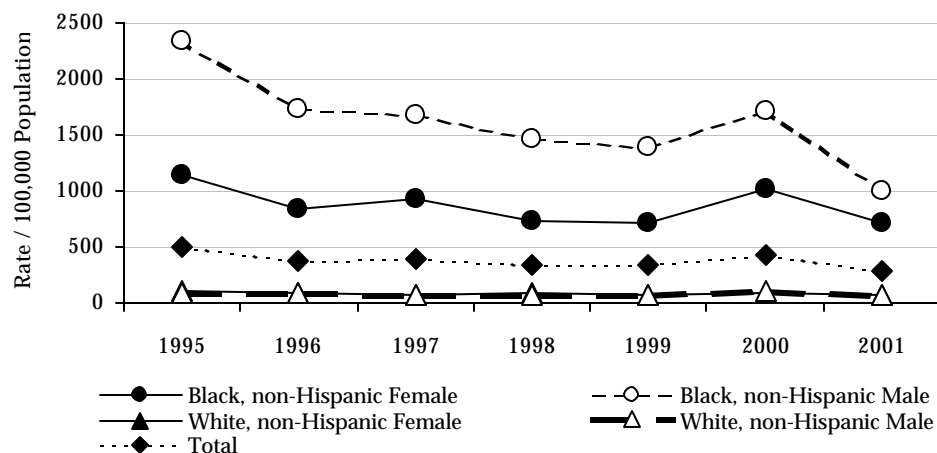
Gonorrhea is a sexually transmitted disease caused by the bacteria *Neisseria gonorrhoeae* and is an important public health concern. Similar to chlamydia, gonorrhea is a major cause of pelvic inflammatory disease because many women remain asymptomatic until complications occur.<sup>1</sup> There is also evidence that gonorrhea infections place individuals at higher risk of contracting HIV if exposed.<sup>2</sup>

Because many cases of gonorrhea are without symptoms, CDC recommends routine screening of women at high risk for STDs.<sup>1</sup> The national Healthy People 2010 goal (25-2) is to reduce new cases of gonorrhea to 19 per 100,000 population.<sup>3</sup>

#### Findings

In Nashville in 2000, there were 2,404 cases of gonorrhea reported to the MPHD. This represents a rate of 422 per 100,000 population. When examined by gender, the rate among men (503) was higher than among women (346). Black males aged 15-24 had the highest rate of disease in Nashville, with a rate of 4,718, nearly 20 times higher than white males in the same age group, and 47 times higher than white males overall (Table 47, Figure 153). After a slight increase between 1999 and 2000 (likely a result of increased surveillance), preliminary data for 2001 show the gonorrhea rate among black males aged 15-24 falling below the rate for women in the same age group to 2,762 (Figure 154). The rate among black males overall fell to 988 in 2001, the lowest level in more than a decade<sup>1</sup> (Figure 153).

**Figure 153. Gonorrhea Rates by Race and Gender, Nashville, TN, 1995 - 2001**



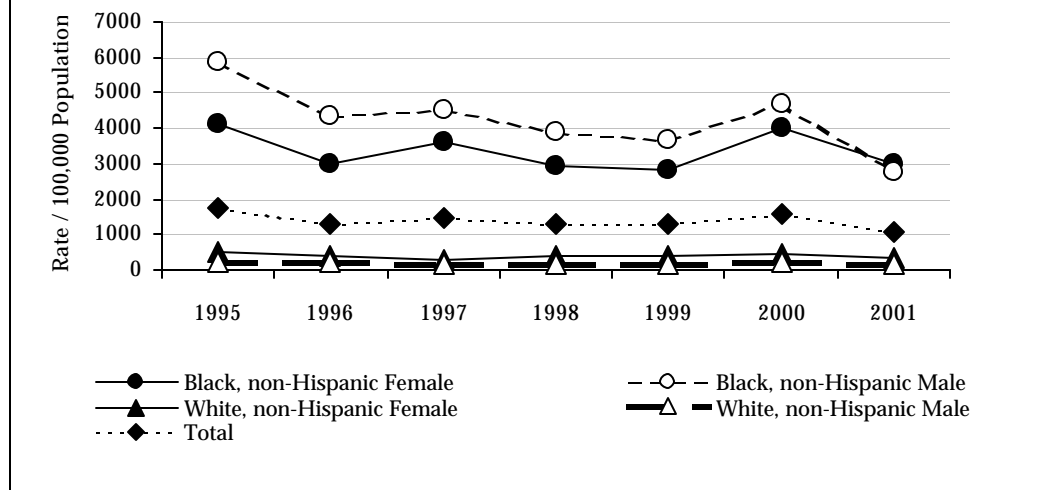
**Table 47. Gonorrhea Rates by Subgroup, Nashville, TN, 2000**

	<b>Gonorrhea Rate/100,000 Population</b>		
	<b>Both Genders</b>	<b>Males</b>	<b>Females</b>
<b>TOTAL</b>	422	503	346
<b>RACE</b>			
<b>Black or African American</b>	1,340	1,717	1,012
<b>White</b>	96	100	93
<b>Other</b>	37	49	22
<i>Asian or Pacific Islander</i>	ψ	ψ	ψ
<i>American Indian or Alaska Native</i>	ψ	ψ	ψ
<b>ETHNICITY</b>			
<b>Hispanic or Latino</b>	119	157	59
<b>Not Hispanic or Latino</b>	430	520	348
<i>Black or African American</i>	1,335	1,707	1,012
<i>White</i>	97	99	95
<i>Other</i>	79	ψ	ψ
<b>AGE</b>			
<b>15-24</b>	1,566	1,523	1,609
<i>Black or African American</i>	4,318	4,718	3,971
<i>White</i>	340	239	442
<i>Other</i>	108	122	88
<i>Hispanic or Latino</i>	226	ψ	ψ
<i>Not Hispanic or Latino</i>	1,657	1,656	1,658
<i>Black or African American</i>	4,322	4,707	3,989
<i>White</i>	346	234	454
<i>Other</i>	ψ	ψ	ψ
<b>25-34</b>	606	787	417
<b>35-44</b>	322	491	157

ψ Data are statistically unreliable.

Gonorrhea rates in Nashville are higher than Tennessee or U.S. rates.

**Figure 154. Gonorrhea Rates Among Young Adults Aged 15-24 by Race and Gender, Nashville, TN, 1995 - 2001**

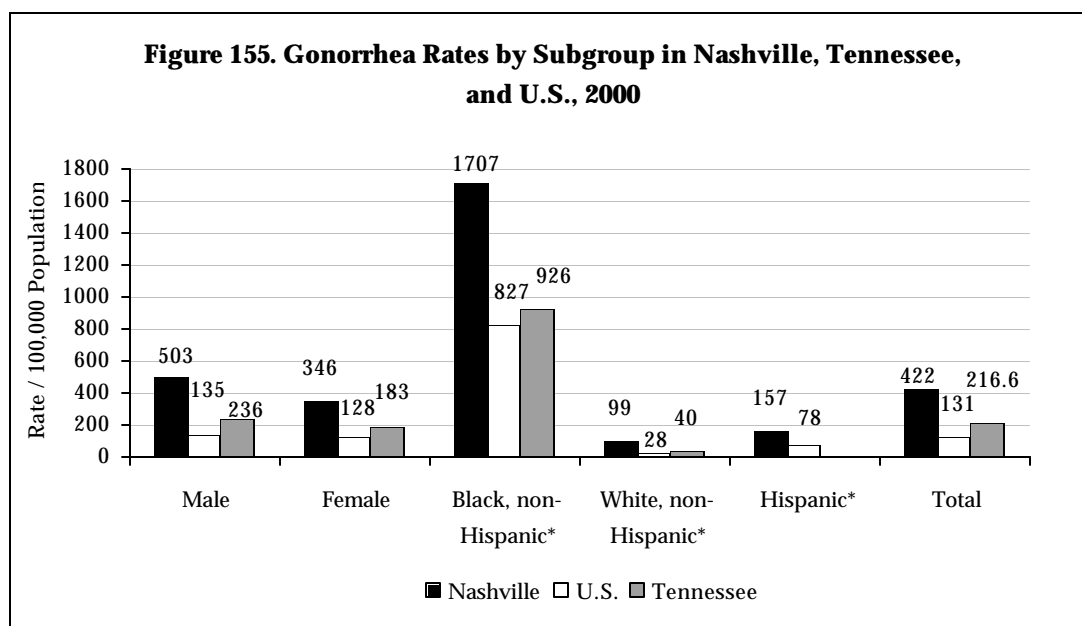


### ***Comparing Nashville to Tennessee and the U.S.***

The national rate of gonorrhea was 131 per 100,000 population in 2000.<sup>4</sup> This represents a decrease from 150 in 1995,<sup>6</sup> but an increase from 124 in 1996.<sup>2</sup> U.S. rates have been relatively steady at about 132 per 100,000 from 1998 to 2000.<sup>2</sup> In 2000, Tennessee ranked 7<sup>th</sup> in the nation<sup>2</sup> with an overall rate of 209. Gonorrhea rates in Nashville are higher than Tennessee or U.S. rates, however, Nashville is an urban center and rates are expected to be higher. As opposed to chlamydia rates, gonorrhea rates are higher among men than among women, most likely because men exhibit symptoms more frequently than do women. Among U.S. women in 2000, the rate was slightly lower (130) than among men (136), consistent with previous years. Similar to national rates of disease, gonorrhea rates among Tennessee and Nashville women have been consistently lower than rates among men over the past 5 years although the gender disparity is greater (Figure 154). There is also a racial disparity in gonorrhea rates. Blacks have consistently higher rates than whites in Nashville, Tennessee, and the U.S. The racial disparity is less pronounced in Nashville, where blacks have a rate 17 times that of whites, than in Tennessee or the U.S. where the rates are 23 and 29 times greater among blacks than among whites, respectively (Figure 155). Hispanics had a rate 50% higher than whites in Nashville, and nearly three times that of whites in the U.S. overall.

### **Discussion**

As expected, Nashville has not met the national Healthy People objectives for the reduction of gonorrhea, in part because it is an urban center. However, targeting populations with the highest rates of disease in Nashville (blacks, especially men, and 15-24 year olds) will help bring local rates closer to national goals. The high rate of gonorrhea in Nashville indicates that this disease continues to be an important public health concern. The relative stability of gonorrhea rates over the past 3 years suggests that new prevention and control strategies may need to be implemented in order to reach those populations at highest risk of disease and to reduce rates even further.



\*Ethnicity information was not available for Tennessee, therefore, rates by race for Tennessee are reported without taking ethnicity into account.

#### References:

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The high rate of gonorrhea in Nashville indicates that this disease continues to be an important public health concern.

### 3.4.3.3 Syphilis

#### Background

In Nashville in 2000, there were 200 cases of syphilis reported to MPHD. Syphilis rates in Nashville increased from 1995 - 1999 and are now on the decrease.

Syphilis is a sexually transmitted disease caused by the spirochetal bacterium, *Treponema pallidum*. Syphilis begins with an ulcer at the point of infection and if left untreated, can result in long-term effects such as neurological or cardiovascular damage. The genital ulcers caused by syphilis can facilitate the transmission of HIV, especially in populations with high rates of both HIV and syphilis. Pregnant women infected with syphilis are at risk for miscarriage and fetal death, and children born to mothers infected with syphilis are at risk for birth defects and other disorders.<sup>1</sup>

Because syphilis is easily detectable with a blood test, is easily curable with penicillin, and is confined to a limited number of geographic areas, there is currently a national effort, lead by the CDC, to eliminate syphilis.<sup>2</sup> The national Healthy People goal (25-3) for the elimination of syphilis calls for the reduction of primary and secondary (P&S) syphilis to 0.2 cases per 100,000 population.<sup>3</sup>

#### Findings

In Nashville in 2000, there were 200 cases of syphilis reported to MPHD. Syphilis rates in Nashville increased from 1995—1999 and are now on the decrease. In 2000, the rate of P&S syphilis in Nashville was 35.1 per 100,000 population, down from 47.2 in 1999. The syphilis rate among males is higher than among females. Males in 2000, had a P&S syphilis rate 50% higher (42) than females (28). When examined by race group, a large disparity between blacks and whites is apparent. In 2000, blacks in Nashville had a P&S syphilis rate of 105.0, nearly nine times higher than the rate among whites (11.8) (Table 48). Overall, black males had a rate of 138.4 (compared to white males with a rate of 11.9) and black females had a rate of 75.9 (compared to white females with a rate of 11.7). The gender disparity widens among blacks. Among black males the rate of disease is almost twice the rate among females, however, there is virtually no gender disparity apparent among whites (Table 48).

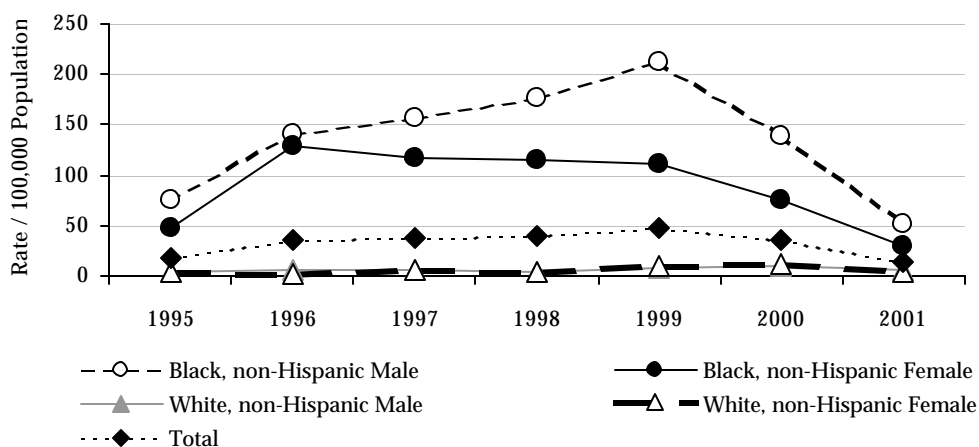
#### Comparing Nashville to Tennessee and the U.S.

Nationally, the rate of primary and secondary syphilis was 2.2 per 100,000 population in 2000. If all stages of syphilis are included, the national rate was 11.6<sup>4</sup>. These rates are the lowest rates ever reported and are half of what they were just five years ago. In contrast, the state of Tennessee ranked first in the nation in 2000<sup>4</sup> with a rate of primary and secondary syphilis of 9.4. Of those cases reported from Tennessee, 200 or 38% were reported from Nashville. Nashville also ranked first in the nation among cities >200,000 population, with the highest reported rate of primary and secondary syphilis (35.1). (Another Tennessee city, Memphis, ranked 4<sup>th</sup> with a rate of 27.4). In 2000, the rate of P&S syphilis in Nashville was nearly four times higher than the rate in Tennessee, and sixteen times higher than the national rate (Figures 156 and 157).

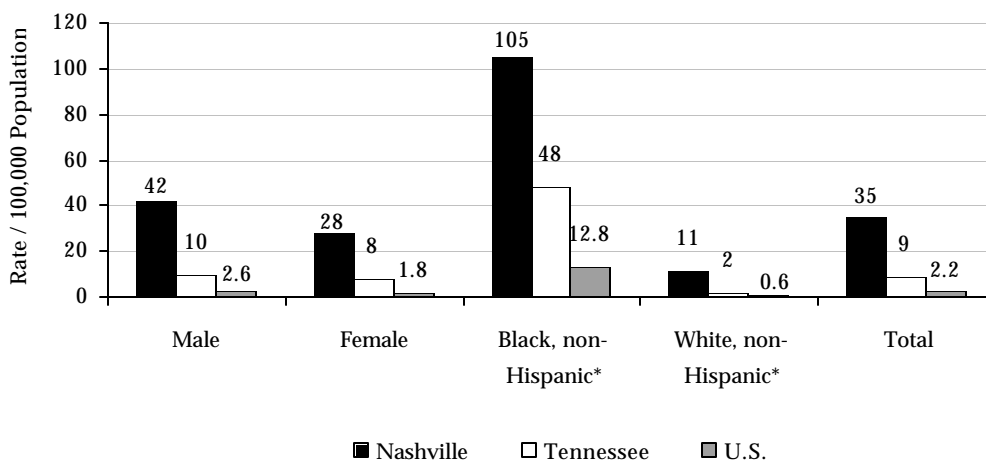
Gender and race disparities in syphilis rates existed in Tennessee and in the U.S. as well as in Nashville. Similar to the disparity in Nashville, U.S. men had a rate (2.7) 50% higher than women (1.8), while the gender disparity in Tennessee was less pronounced, with the rate just 15% higher among men compared to women. Blacks in Nashville had a P&S syphilis rate nearly nine times higher than whites in 2000. The disparity in Tennessee was twice as large, with blacks having a P&S syphilis rate (47.6) 24 times the rate among whites (1.7). Nationally, the disparity was even greater. Blacks in the U.S. had a P&S syphilis rate of 12.8, 32 times greater than the rate of just 0.4 among whites.



**Figure 156. Primary and Secondary Syphilis Rates by Race and Gender, Nashville, TN, 1995 - 2001**



**Figure 157. Primary and Secondary Syphilis Rates by Subgroup in Nashville, Tennessee, and U.S., 2000**



\*Ethnicity information was not available for Tennessee, therefore, rates by race for Tennessee are reported without taking ethnicity into account.

**Table 48. Primary and Secondary Syphilis Rates by Subgroup, Nashville, TN, 2000**

	Primary and Secondary Syphilis Rate/100,000 Population		
	Both Genders	Males	Females
<b>TOTAL</b>	35.1	42.4	28.2
<b>RACE</b>			
<b>Black or African American</b>	105.0	138.4	75.9
<b>White</b>	11.8	11.9	11.7
<b>Ethnicity</b>			
<i><b>Hispanic or Latino</b></i>	ψ	ψ	ψ
<i><b>Not Hispanic or Latino</b></i>	36.2	43.9	29.2
<b>Black or African American</b>	105.5	139.2	76.3
<b>White</b>	11.3	10.6	11.9
<b>Other</b>	ψ	ψ	ψ
<b>AGE</b>			
<b>15-24</b>	55.9	49.1	62.6
<b>25-34</b>	59.9	62.7	57.0
<b>35-44</b>	59.9	73.5	46.5
<b>45+</b>	19.6	37.0	5.9

ψ Less than five cases reported, rates not calculated.

### Discussion

Nashville recently experienced a syphilis epidemic, which was first recognized in 1998.<sup>5,6</sup> Once the epidemic was identified, MPHD took aggressive action to combat the rising syphilis rates. The rate of P&S syphilis initially increased during and shortly after the epidemic period due, in part, to increased surveillance. Since then, the rates have steadily declined as a result of the many programs that were implemented in response to the epidemic; and thanks to the efforts of health workers, doctors, nurses, and volunteers throughout Nashville.

One of the programs implemented during this time-period was the STD Free! initiative. STD Free! is a community-based coalition that works to reduce disease through the cooperation of government, professional, and community representatives. In addition to educating policy makers and the community, STD Free! targets nurses, educators, physicians, clinics, and medical students, stressing the importance of testing and reporting in both public and private practice.<sup>7</sup>

Another important contribution to the decline in syphilis has been the jail-based syphilis-screening program. It was recognized early on, that a large percentage of syphilis cases had previously been arrested for sex or drug related offenses.<sup>6</sup> As a result, a program was implemented where all detainees at the Davidson County Criminal Justice Center (CJC) are offered voluntary syphilis screening as part of the medical intake process. If positive, individuals are treated and interviewed to identify sexual contacts and other at-risk individuals. Since the inception of this program in November of 1999, more than 30% of syphilis cases in Nashville have been identified through the CJC.

Nashville had not achieved the Healthy People 2010 goal for syphilis elimination of 2.2 new cases per 100,000 population<sup>3</sup> by 2000. Preliminary 2001 data shows syphilis rates in Nashville falling to record lows (Figure 156). Rates have declined significantly over the past two years, and if this trend continues, Nashville should be on track to achieve syphilis elimination by 2010. Continued effort and vigilance is required to ensure that rates do not again increase.

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Nashville had not achieved the Healthy People 2010 goal for syphilis elimination of 2.2 new cases per 100,000 population by 2000. Preliminary 2001 data shows syphilis rates in Nashville falling to record lows.

### 3.4.3.4 HIV and AIDS

#### Background

In Nashville in 2000, there were 277 cases of AIDS and 248 cases of HIV reported, which corresponds to 48.6 AIDS cases and 43.5 HIV cases for every 100,000 people living in Nashville.

Acquired immunodeficiency syndrome (AIDS) was first recognized in 1981 as a new infectious disease<sup>1-2</sup>. AIDS is caused by the human immunodeficiency virus (HIV), which attacks the cells of the body's immune system destroying its ability to fight infection.

HIV is transmitted through contact with the bodily fluids of an infected individual such as blood, semen or vaginal fluid. It is most often transmitted by sexual contact, but can also be transmitted through an infected blood transfusion or organ transplant, through needle stick injuries or the sharing of contaminated needles, or from an infected mother to her unborn child. HIV is not transmitted through kissing or by contact with the saliva of an infected individual.

#### *Why do we track HIV and AIDS?*

HIV and AIDS have had a significant impact on the health of our nation. According to the CDC, as of December 31, 2000, 774,467 AIDS cases had been reported, and 58% of those cases are known to have died<sup>3</sup>. Tied to the emergence of HIV and AIDS, we have also seen the re-emergence of diseases once thought conquered, such as tuberculosis. In addition, the health-care costs of treatment for HIV and AIDS are extremely high. Researchers have estimated the lifetime treatment cost of a person diagnosed with HIV to be \$155,000.<sup>4</sup>

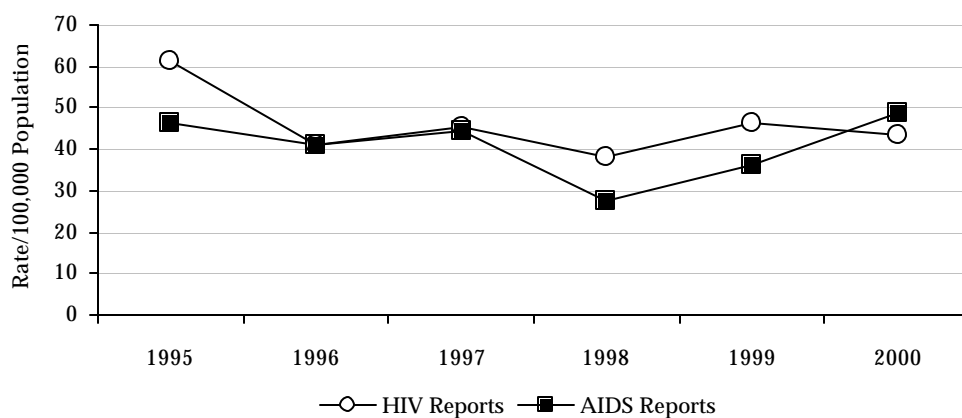
#### *Health objectives and targets*

Healthy People 2010 objective 13-1 measures the rate of new AIDS cases in the population and sets a target of 1.0 new AIDS cases among adolescents and adults (aged 13 and older) for every 100,000 persons. This measure is important because in addition to measuring newly identified infections, it is also a measure of treatment access and effectiveness among HIV positive individuals. Objectives 13-2 through 13-4 call for the reduction of AIDS cases among men who have sex with men (MSM) and injection drug users (IVDU); and objective 13-5 calls for a reduction in new HIV infections. The target for objectives 13-2 through 13-5 is a 25% improvement in the number of cases reported.<sup>1</sup>

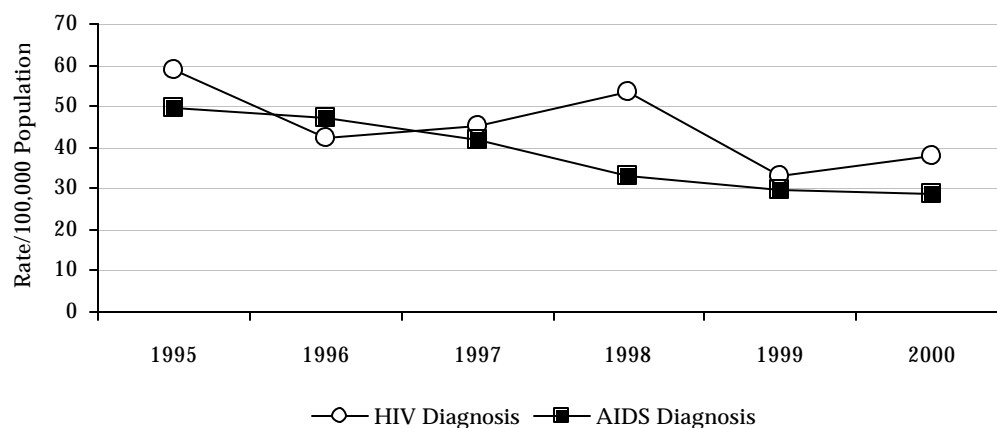
#### Findings

In Nashville in 2000, there were 277 cases of AIDS and 248 cases of HIV reported, which corresponds to 48.6 AIDS cases and 43.5 HIV cases for every 100,000 people living in Nashville. These rates represent an increase from previous years (Figure 158), primarily due to improved surveillance in 2000. To illustrate this point, when new cases are examined by date of diagnosis rather than date of report (Figure 159), the rate of disease decreases steadily from 1995 to 2000. The two trends are different because many of the new cases reported in 2000 had been diagnosed in previous years and were not reported until 2000. The remaining statistics in this section will be calculated based on year of report in order to be comparable to national statistics, which are also based on the date of report.

**Figure 158. Rate of HIV and AIDS by Year of Report,  
Nashville, TN, 1995-2000**

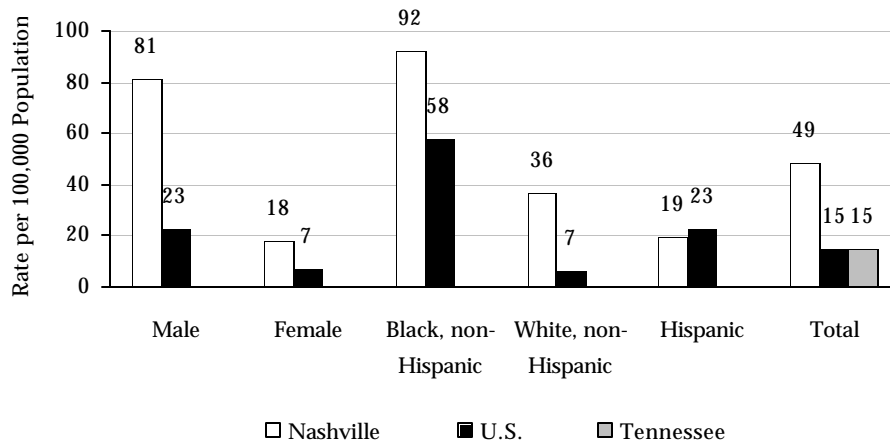


**Figure 159. Rate of HIV and AIDS by Year of Diagnosis,  
Nashville, TN, 1995-2000**

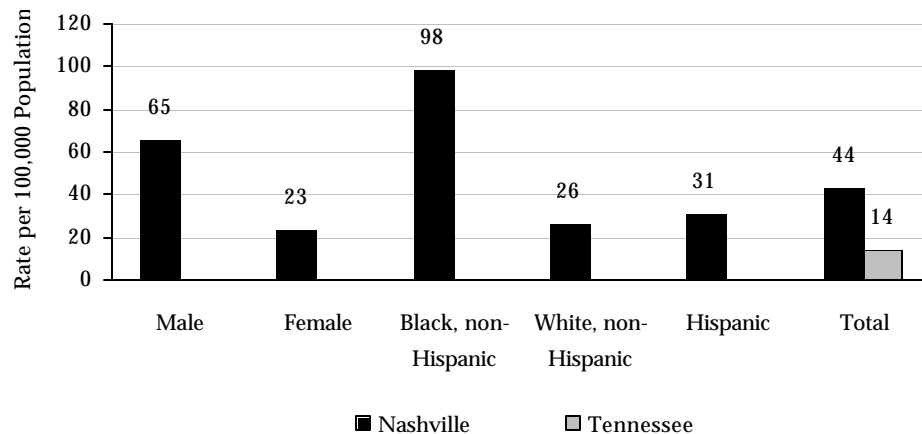


Of the AIDS cases reported in Nashville in 2000, 100% were adolescent/adult cases. There were no AIDS cases reported among children under the age of 13. Eighty-one percent (81%) of AIDS cases were male. The rate of disease was more than four times higher among males than among females (Figure 160). African Americans and whites each made up 49% of new AIDS cases, although the rate of disease was more than two times higher among blacks than among whites (Figure 160).

**Figure 160. Rate of AIDS by Gender and Race/Ethnicity, Nashville and U.S., Reported in 2000**



**Figure 161. Rate of HIV by Gender and Race/Ethnicity, Nashville, TN, Reported in 2000**



Of the HIV cases, 99% were adult cases. There were less than five new cases of HIV reported among children under the age of 13 in year 2000. Seventy-three percent (73%) of HIV cases were male. The gender disparity was not as pronounced for HIV as for AIDS, however, the rate of disease among males was still nearly three times that of females (Figure 160). Fifty-eight percent (58%) of new HIV cases were black, 39% were white, and 3% were Hispanic. Similar to the racial disparity seen among AIDS cases in Nashville, rates of HIV among blacks were nearly four times higher than rates among whites and Hispanics (Figure 161).

MSM made up the largest mode of exposure group, with 53% of AIDS cases and 48% of HIV cases. Twenty-three (23%) of AIDS cases, and 19% of HIV cases were reported among IVDUs; and 12% of AIDS cases and 21% of HIV cases were attributed to heterosexual contact.

***Comparing Nashville to other metropolitan areas, Tennessee, and the U.S.***

It is expected that rates of disease in Nashville will be higher than the disease rates for the state or for the U.S. as a whole because Nashville is an urban center. However, when we compare the rate of AIDS in Nashville to a composite rate (20.4 per 100,000 population) from all metropolitan areas with 500,000 or more population, the rate of disease in Nashville is still twice as high as the composite rate for this group. Published CDC statistics rank Nashville 14<sup>th</sup> by rate and 21<sup>st</sup> by sheer numbers, among 103 cities with populations greater than 500,000<sup>3</sup>.

As expected, when we compare the rates of disease in Nashville to Tennessee rates and U.S. rates, the AIDS rate in Nashville is three times higher than both the Tennessee rate and the national rate. Compared to the U.S. rate, the rate of AIDS in Nashville is four times higher among males, 2.5 times higher among females, 5.5 times higher among whites, almost twice as high among blacks, while the rate of disease among Hispanics is slightly lower than the national rate. The HIV rate in Nashville is also three times higher than the rate in Tennessee overall. National HIV rates were not calculated. (See Technical Notes.)

Similar to the situation in Nashville, HIV and AIDS also disproportionately affect men who have sex with men (MSM) across the U.S., making up 32% of AIDS cases and 29% of HIV cases reported<sup>3</sup>, however the *proportion* of MSM cases in Nashville is much higher than in the U.S. overall. HIV and AIDS transmission among MSM are typically facilitated by “high-risk sexual practices” in “highly infected sexual networks”<sup>1</sup> with high rates of disease as a result. The disproportionate amount of new AIDS and HIV cases among MSM in Nashville compared to the U.S., coupled with the high rate of disease among males in Nashville, suggests continuing high-risk behaviors and increasing transmission in the MSM community. These findings highlight the need for aggressive prevention and education strategies in the MSM community to decrease HIV transmission.

Nationally, 20% of new AIDS cases reported in 2000 were exposed through IV drug use, similar to the proportion of cases in Nashville attributed to IV drug use. However, only 10% of new HIV cases reported nationally were attributed to IV drug use in 2000 in comparison to 19% in Nashville indicating that the combination of IV drug use and transmission of HIV, while declining nationally, is a continued concern in Nashville.

The proportion of black AIDS cases in Nashville and the U.S. are similar, however, whites make up a much larger percentage of new AIDS cases, and Hispanics make up a much smaller percentage of new AIDS cases, in Nashville compared to the U.S. (Figure 160).

Of the HIV cases, 99% were adult cases. There were less than five new cases of HIV reported among children under the age of 13 in year 2000.

### Discussion

There have been many successes in the prevention of HIV and AIDS in Nashville and across the country. With the introduction of new drugs and highly active anti-retroviral therapies (HAART), infected individuals are living with HIV far longer than ever before. In addition, the use of AZT and other drugs in HIV infected pregnant women has cut mother to child transmission drastically in recent years.

Rates of disease in Nashville far exceed the Healthy People 2010 objectives and will most likely continue to exceed these levels because Nashville is an urban center. The rate of decline in AIDS cases appears to be leveling in Nashville, and HIV cases appear to be increasing slightly. However, much improvement and reduction in the transmission of HIV is possible if prevention efforts are targeted at those population subgroups with increasing rates (blacks and women), and those communities with the highest transmission rates (MSM and IV drug users).

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3. Centers for Disease Control and Prevention. *HIV/AIDS Surveillance Report*, 2000; 12 (No.2).
4. Centers for Disease Control and Prevention. *HIV Prevention Strategic Plan through 2005. Appendix C*. January 2001.

Rates of HIV and AIDS in Nashville far exceed the Healthy People 2010 objectives and will most likely continue to exceed these levels. The rate of decline in AIDS cases appears to be leveling in Nashville, and HIV cases appear to be increasing slightly.



## Related Indicators

- Cancer screening
- Leading causes of death
- Years of potential life lost
- Sexually transmitted diseases
- Economic dimension of health problems

## 3.5 Cancer Incidence

### Background

Cancer is a diverse group of diseases characterized by uncontrolled growth and the spread of abnormal cells <sup>1</sup>. If the spread is not controlled, it can result in death. Cancer is caused by external and internal factors. Anyone can get cancer. The lifetime probability of developing cancer is higher in men (1 in 2) than in women (1 in 3) <sup>2</sup>. Cancer incidence is one of the most important indicators in assessing the population-based risk of developing cancer. Each year, newly diagnosed cancer cases are reported to the Tennessee Cancer Registry, which was established in 1984. Since new cases diagnosed and treated in non-hospital facilities were not reported before 2000, incidence data between 1980s and 1990s may not be 100% accurate. Due to reporting and data processing delay, a few years of time lag is expected regarding incidence data availability. However, cancer incidence is still the best indicator to monitor a community's cancer occurrence trend.

Cancers are usually classified according to their organ or tissue of origin (site code) and according to their histologic features (morphology code). <sup>1</sup> In this report, we report cancers by site.

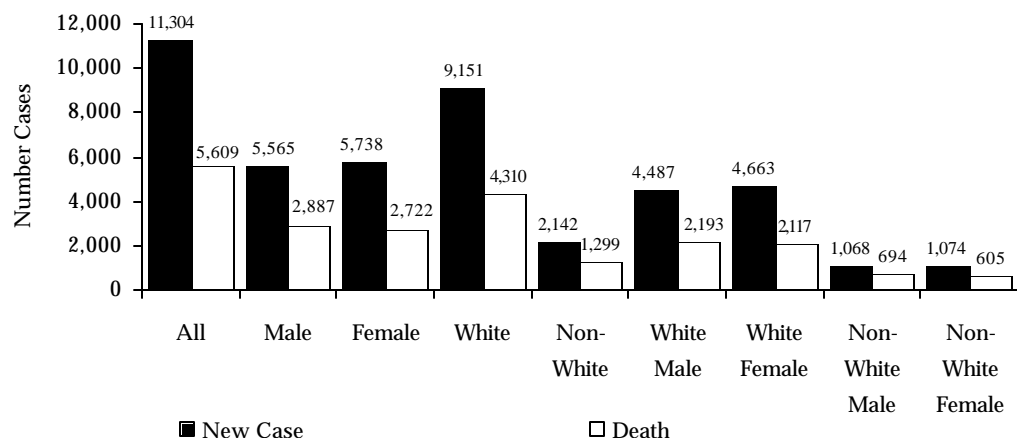
## Additional Data

Appendices  
pages D-82 - D-83

### Findings

From 1992 to 1996, 11,304 new cancer cases were reported in Nashville. Of these new cases, 5,565 (49.2%) were diagnosed in males and 5,738 (50.8%) were diagnosed in females, 9,151 (81.0%) cases were white, and 2,142 (18.9%) cases were non-white. (Information regarding subcategories of non-white was not available). During the same time period, there were 5,609 cancer deaths, approximately half (49.6%) of newly diagnosed cancer cases (Figure 162).

**Figure 162. Number of New Cancer Cases and Number of Cancer Deaths by Gender and Race, Nashville, TN, 1992-1996**

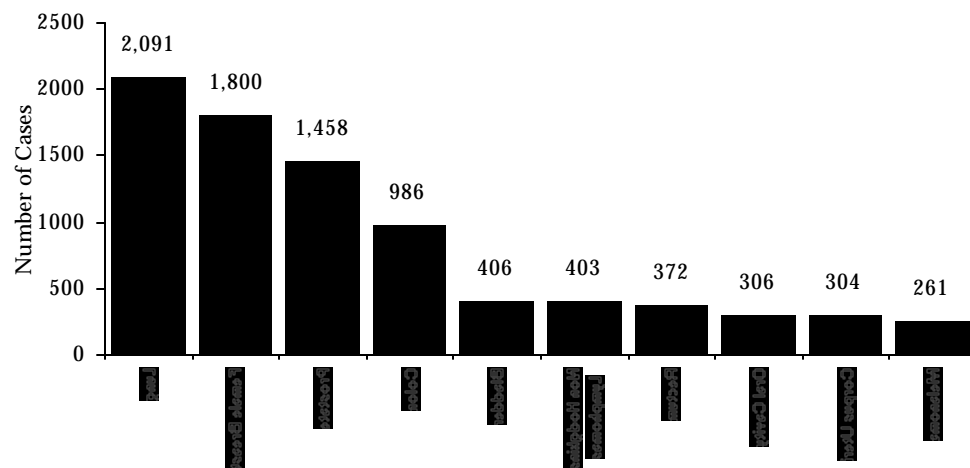


## Data Sources

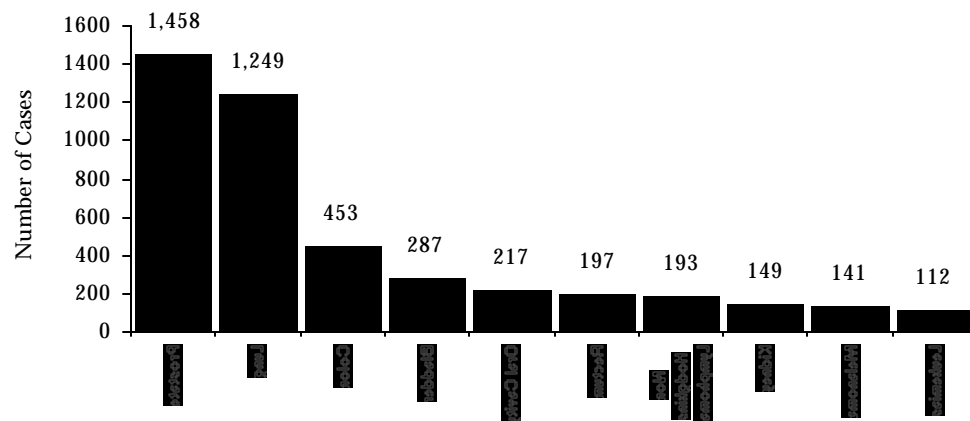
Tennessee Department  
of Health

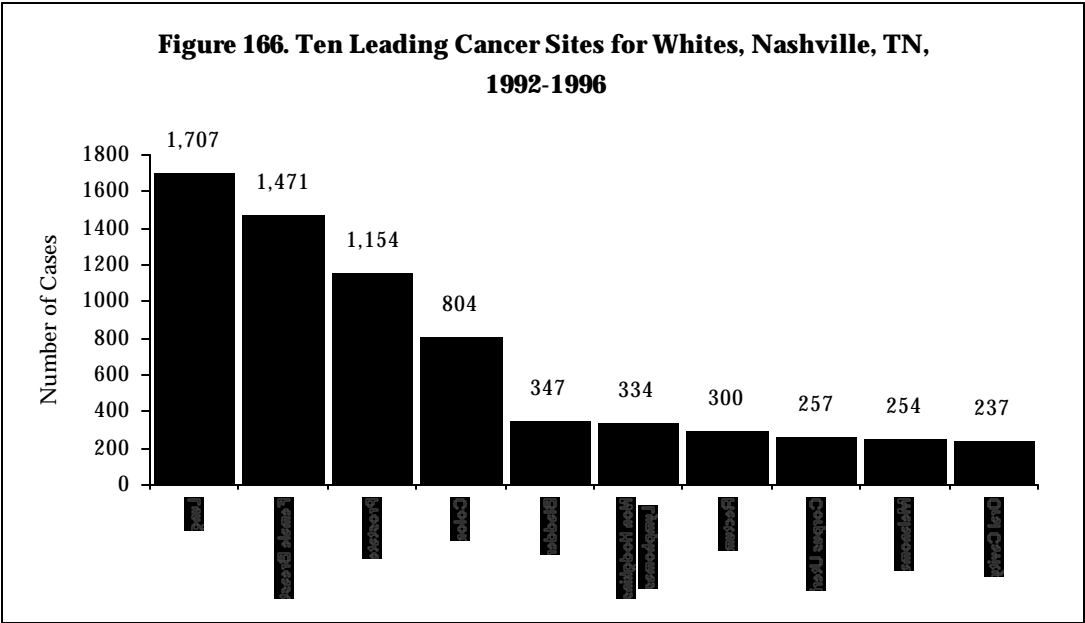
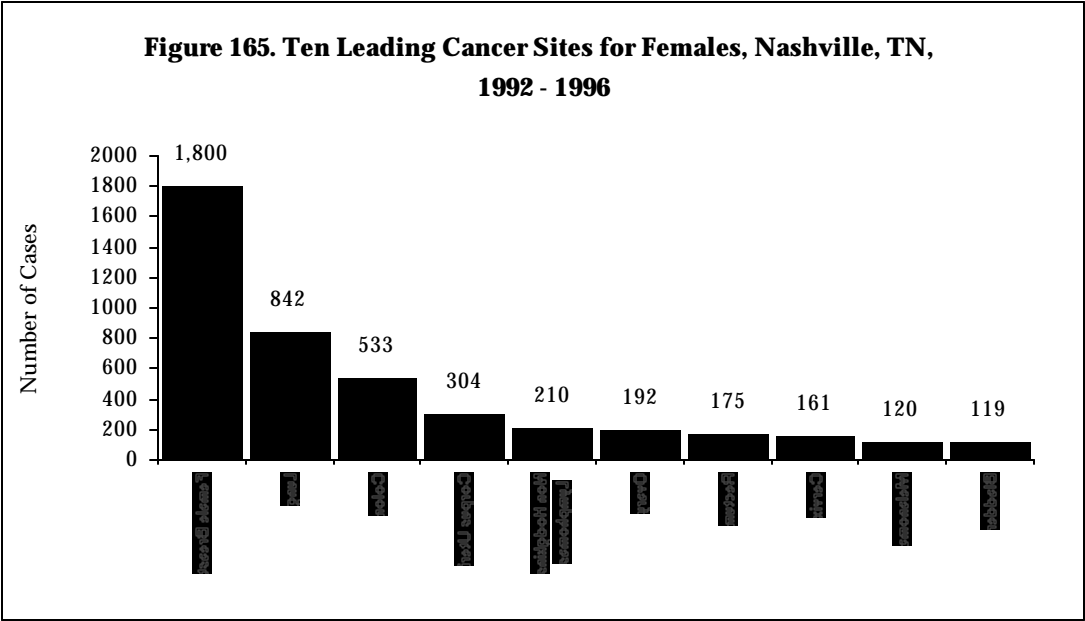
Of all cancer sites, the top three sites were lung, female breast, and colon. Together, these three sites had almost half (47.3%) of all newly diagnosed cancer cases. For males, the top three cancer sites were prostate, lung, and colon, accounting for more than half (56.8%) of new cancer cases in males. For females, the top three cancer sites were female breast, lung, and colon, accounting for more than half (55.3%) of new cancer cases in females. For whites, the top three cancer sites were lung, female breast, and prostate, accounting for nearly half (47.3%) of new cancer cases in whites. For non-whites, the top three cancer sites were lung, female breast, and prostate, accounting for nearly half (47.3%) of new cancer cases in non-whites (Figures 163 - 167).

**Figure 163. Ten Leading Cancer Sites, Nashville, TN, 1992-1996**



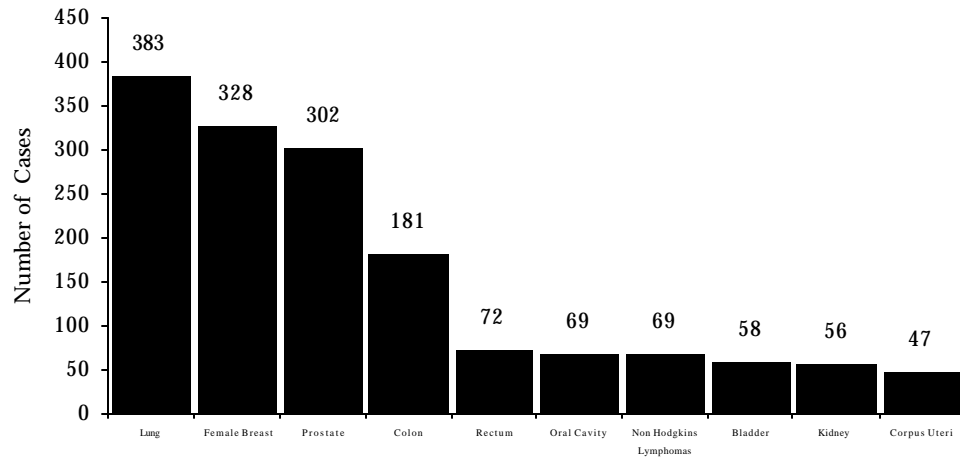
**Figure 164. Ten Leading Cancer Sites for Males, Nashville, TN, 1992 - 1996**





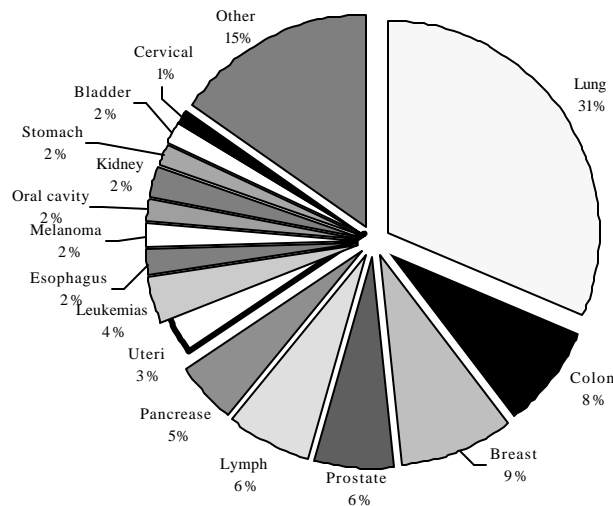
Of all cancer sites, the top three sites were lung, female breast, and colon.

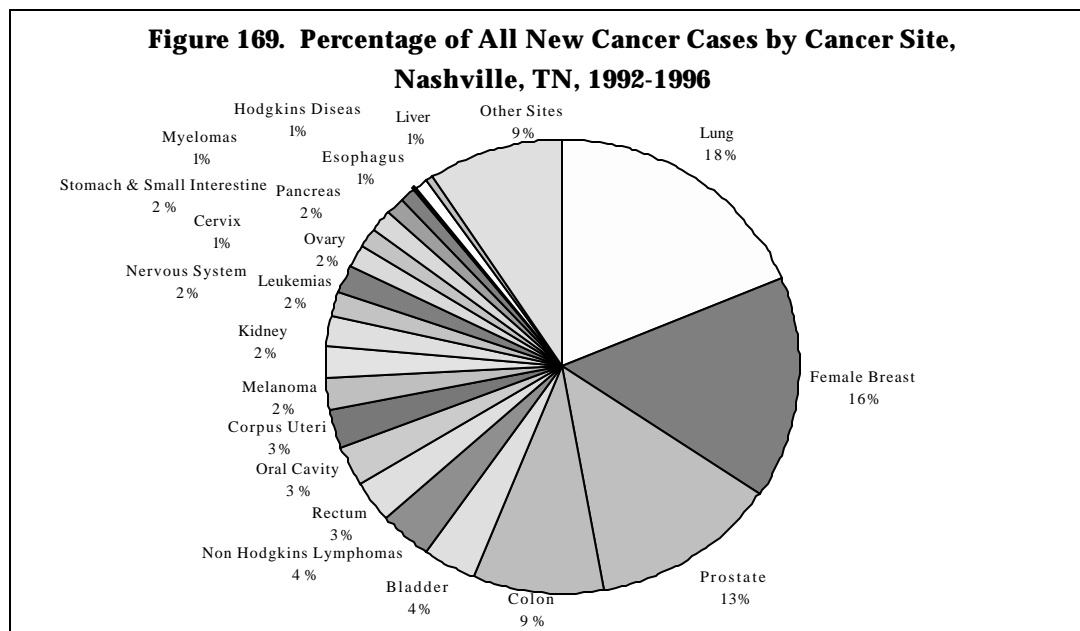
**Figure 167. Ten Leading Cancer Sites for Non-Whites, Nashville, TN, 1992-1996**



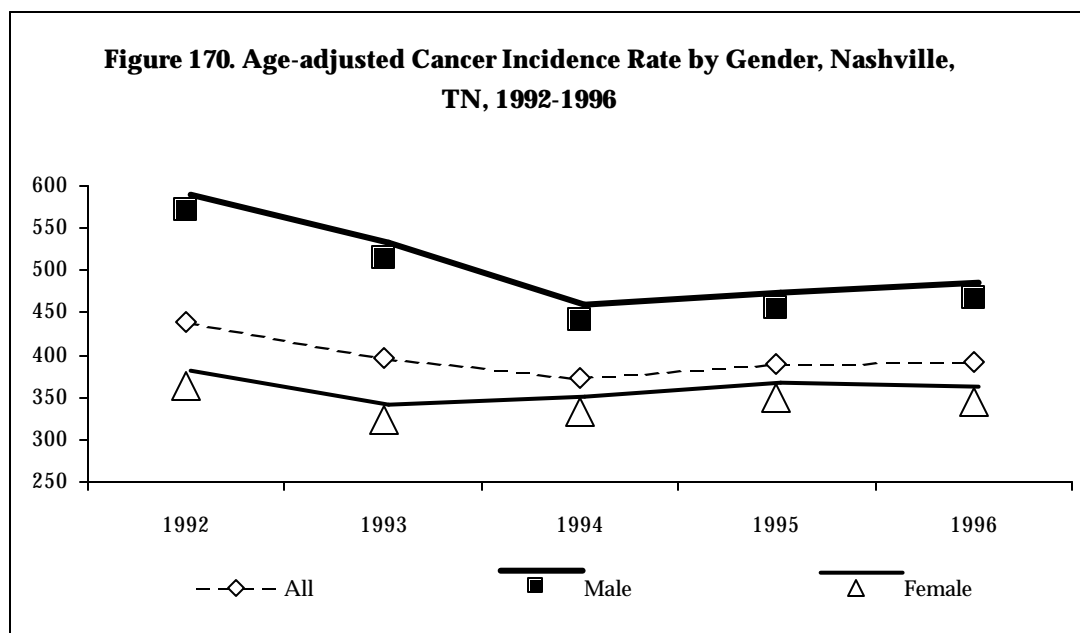
Figures 168 and 169 reveal that although lung cancer accounted for 18% of all new cancer cases during 1992-1996, it was responsible for 31% of all cancer deaths during the same period. In contrast, female breast cancer accounted for 16% of new cases, but was only responsible for 9% of cancer deaths. While prostate cancer accounted for 13% of new cases, it was only responsible for 6% of cancer deaths. Likewise, 9% of new cancer cases were due to colon cancer but 8% of all cancer deaths during this time period were from colon cancer.

**Figure 168. Percentage of All Cancer Deaths by Cancer Site, Nashville, TN, 1992-1996**

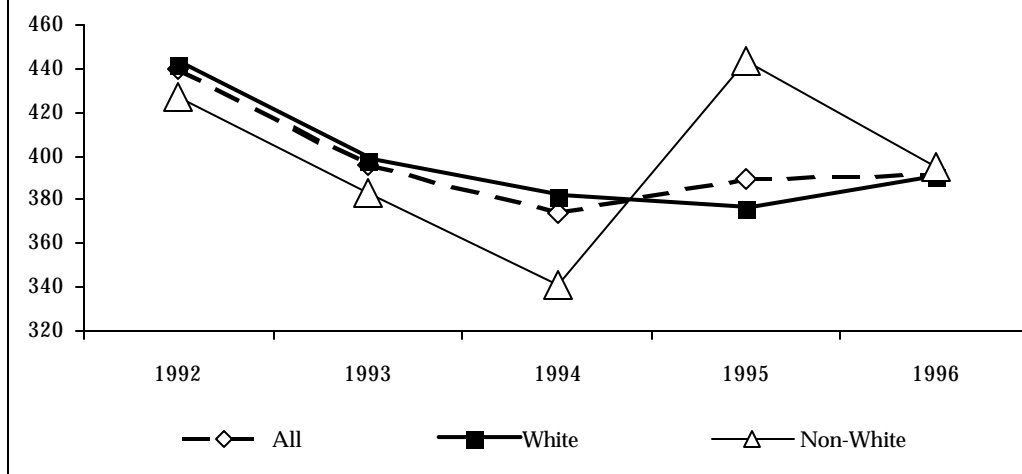




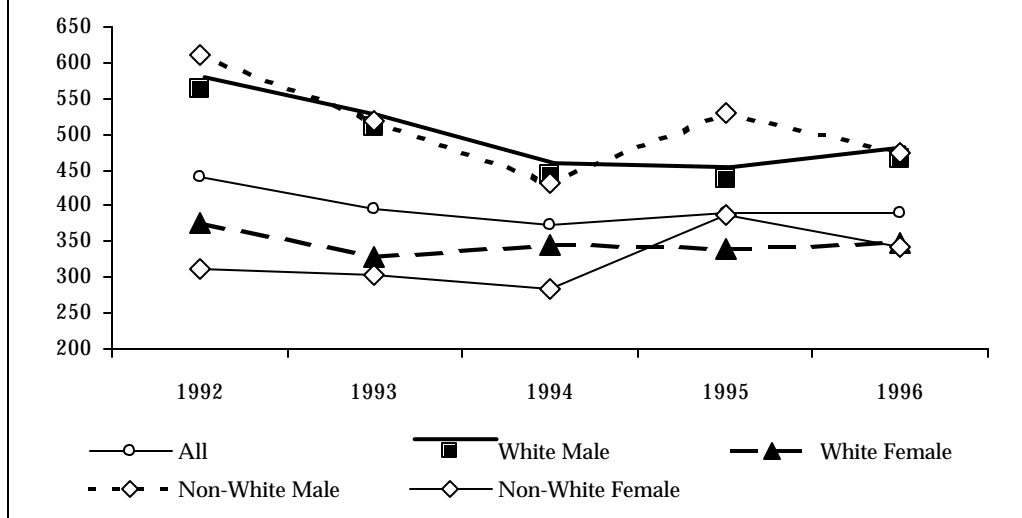
Examination of the overall cancer incidence trend in Nashville from 1992 to 1996 revealed that the age-adjusted cancer incidence declined from 1992 to 1994, and increased slightly between 1994 to 1996. This trend was observed for the total population and for both males and females. For whites, the declining trend ended in 1995 and began to increase in 1996. For non-whites, the trend was declining until 1994, but had a dramatic increase in 1995, and then declined again in 1996 (Figures 170-172).



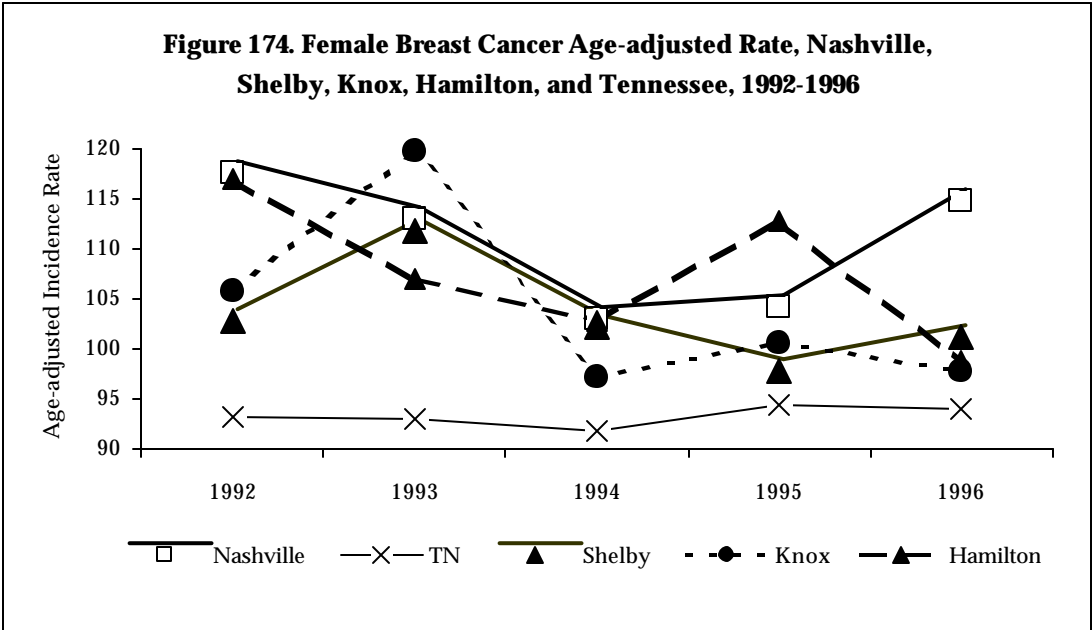
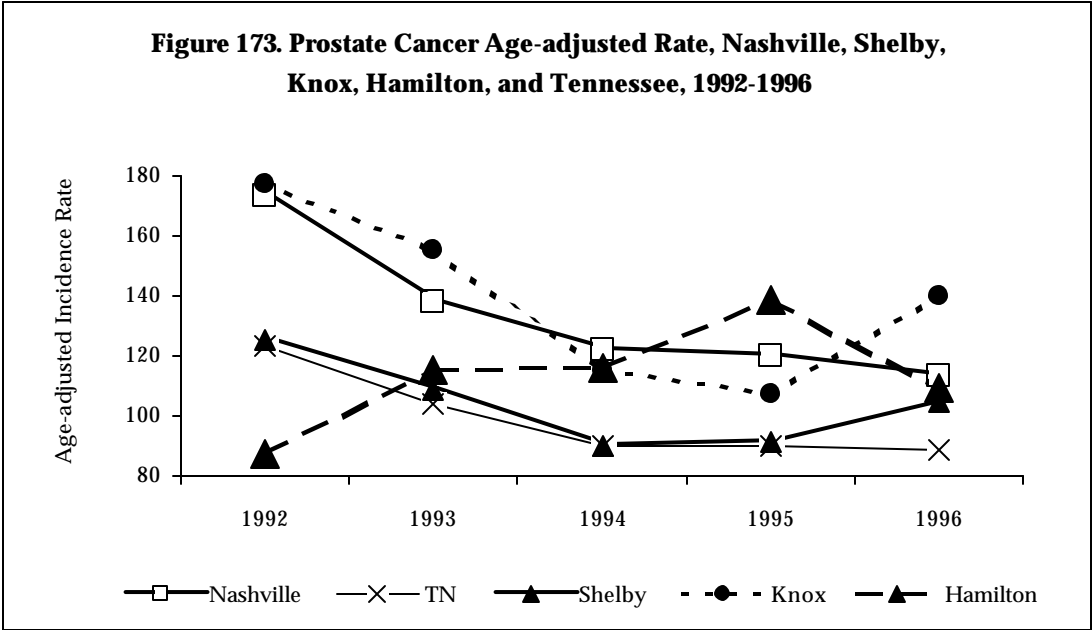
**Figure 171. Age-adjusted Cancer Incidence Rate by Race, Nashville, TN, 1992-1996**



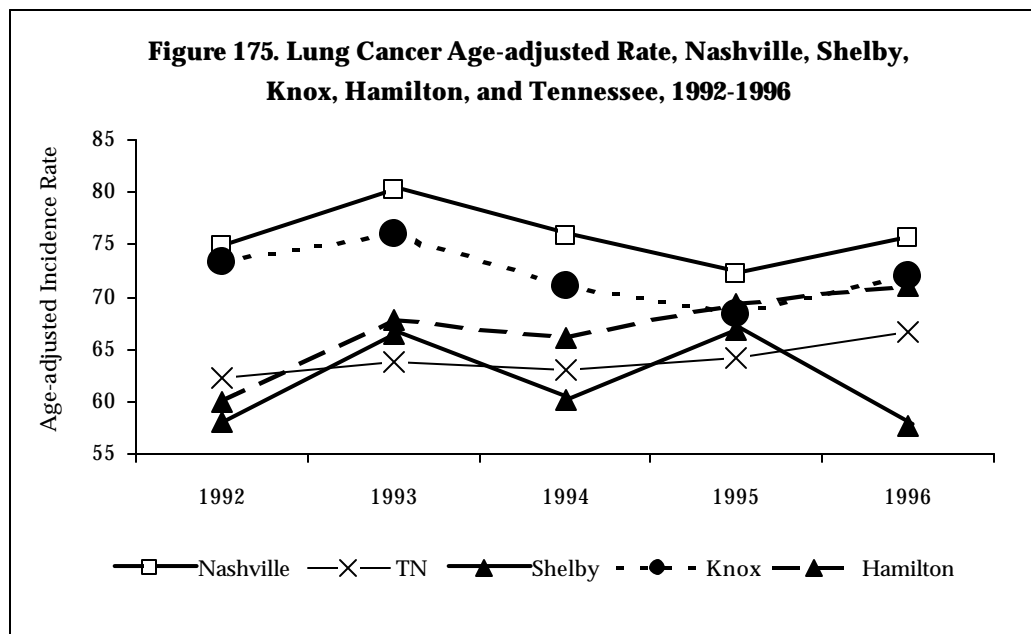
**Figure 172. Age-adjusted Cancer Incidence Rate by Gender and Race, Nashville, TN, 1992-1996**



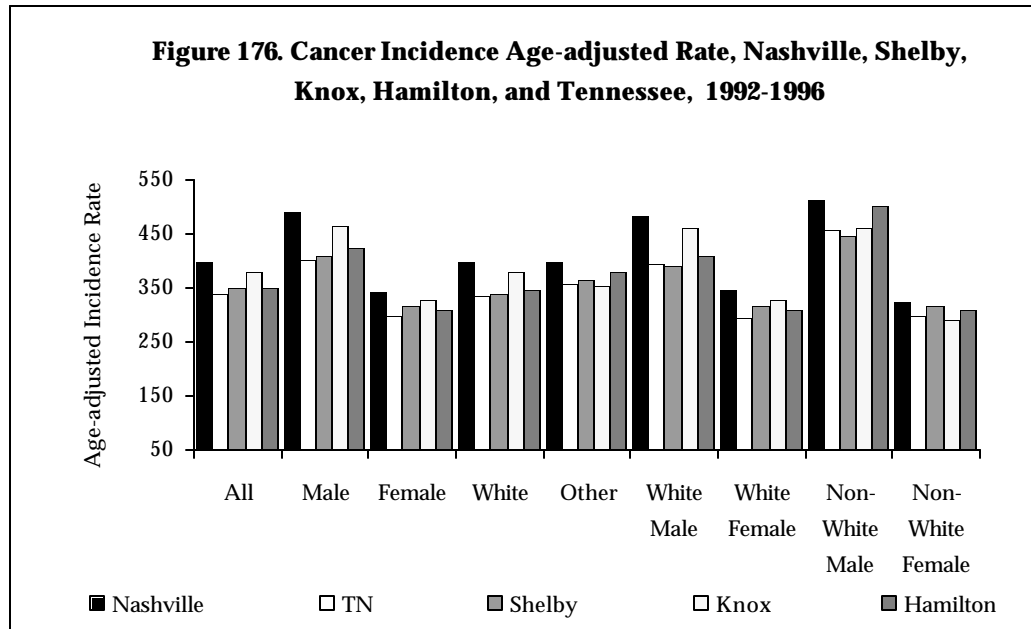
A further examination of cancer incidence trends by site revealed that while prostate cancer demonstrated a continuous decline from 1992-1996, female breast cancer exhibited a declining trend from 1992-1994 but increased from 1995 to 1996. Lung cancer fluctuated slightly but remained relatively stable (Figures 173-175).



Although lung cancer accounted for 18% of all new cancer cases during 1992 - 1996, it was responsible for 31% of all cancer death during the same period.



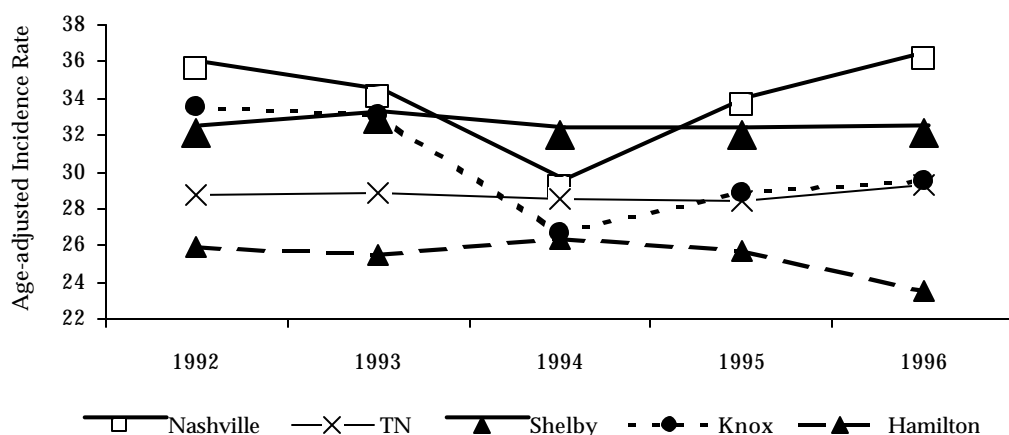
When comparing Nashville's cancer incidence rates with that of Tennessee and three other metropolitan counties (Shelby, Knox, Hamilton), Nashville's rates were consistently higher. This holds true across gender and race (Figure 176).



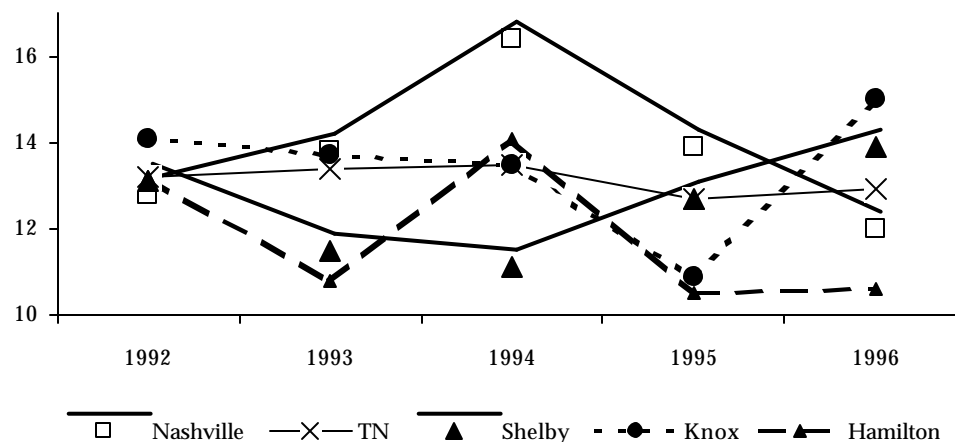


Nashville also had consistently higher rates than Tennessee, Shelby, Knox, and Hamilton Counties for lung cancer (Figure 175). Similarly, Nashville's female breast cancer rates were higher than the comparison groups for the years 1992, 1994, and 1996 (Figure 174). For prostate cancer, Nashville's rates were consistently higher than those of Tennessee and Shelby County. The prostate cancer rate was higher than that of all three metropolitan counties only in 1994 (Figure 173). For colon cancer, Nashville's rate is higher than that of Tennessee, and Shelby, Knox, and Hamilton Counties for all years except 1994 (Figure 177). For bladder cancer, Nashville's rate increased from the lowest among Tennessee and four metropolitan counties in 1992 to the highest in 1993, 1994, and 1995. The rate then declined again in 1996 to the second lowest among Tennessee and four metropolitan counties (Figure 178).

**Figure 177. Colon Cancer Age-adjusted Rate, Nashville, Shelby, Knox, Hamilton, and Tennessee, 1992-1996**



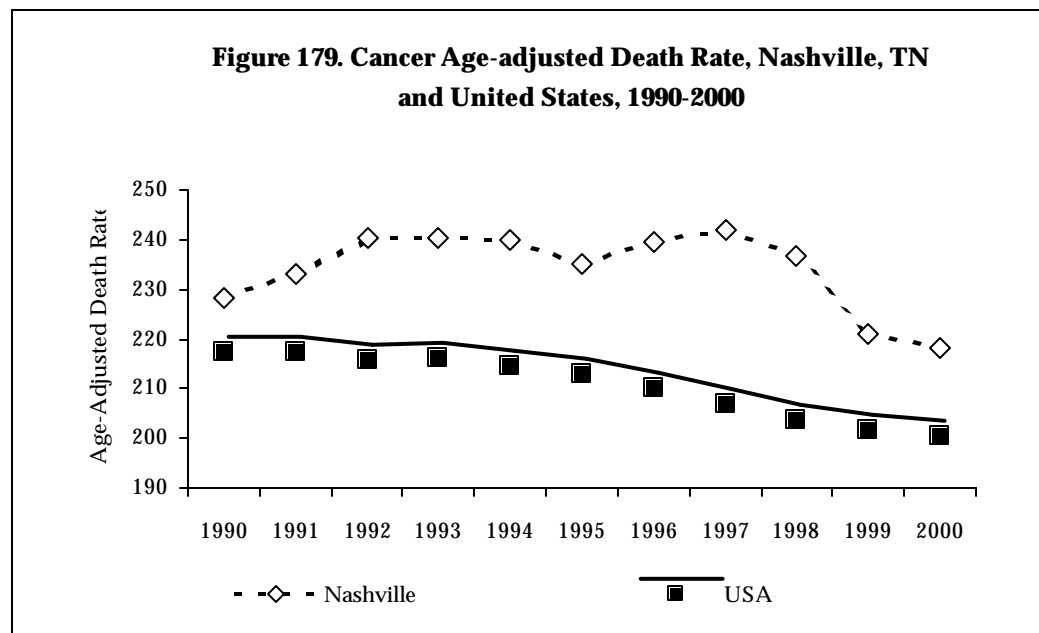
**Figure 178. Bladder Cancer Age-adjusted Rate, Nashville, Shelby, Knox, Hamilton, and Tennessee, 1992-1996**



## Discussion

Healthy People 2010's goal regarding new cancer cases is to "reduce the number of new cancer cases as well as the illness, disability, and death caused by cancer," but there were no specific objectives for new cancer cases.<sup>3</sup> According to *Cancer Progress Report 2001* released by the National Cancer Institute, our nation's efforts in cancer prevention and control are making a difference. Across the nation, people are adopting good health habits that reduce cancer risk. The rates of new cancers are decreasing, and cancer death rates overall have dropped. Additionally, improvements in treatment options are helping people who have had cancer live longer, with the opportunity to enjoy a better quality of life than was possible years ago. Despite these improvements, however, cancer remains a major public health problem - one that profoundly affects the more than 1 million people diagnosed each year, as well as their families and friends.<sup>4</sup>

Overall, the assessment of our nation's cancer situation is applicable on a local level. Nashville's cancer mortality data show a declining trend during 1990 to 2000 (Figure 179). However, Nashville's decline is not as smooth as the nation's cancer decline. Mortality rates increased from 1990 to 1992, plateaued from 1992 to 1994, decreased from 1994 to 1995, increased again from 1995 to 1997, and then began to decrease from 1997 to 2000. Regarding cancer incidence, the age-adjusted incidence rate decreased from 1992 to 1994 and increased slightly from 1994 to 1996. Since the latest cancer incidence data is not available at this time, it is difficult to predict the future of this trend. However, 1992-1996 cancer incidence data suggest that cancer is still a major public health problem in our community. On average, 2,261 Nashville residents were newly diagnosed with cancer, and 1,122 Nashville residents died of cancer each year during 1992-1996. The impact on the patients, their families and friends, and community as a whole is enormous.



## References:

1. Brownson R, Remington P, and Davis J. *Chronic Disease Epidemiology and Control*. 2nd Ed. American Public Health Association; 1998.
2. Greenlee RT, Hill-Harmon MB, et al. Cancer statistics, 2001, CA. *A Cancer Journal for Clinicians*. 2002; Vol 51/Nov 1, January/February.
3. U.S. Department of Health and Human Services. *Healthy People 2010 (Conference Edition, in Two Volumes)*. Washington, DC: January, 2000.
4. National Cancer Institute. *Cancer Progress Report 2001* [online]. Available at: <http://progressreport.cancer.gov/index.asp>. Accessed February 20,2002.

Nashville's cancer mortality data show a declining trend during 1990 to 2000. Regarding cancer incidence, the age-adjusted incidence rate decreased from 1992 to 1994 and increased from 1994 to 1996.